

Reference Manual for the Model DG632 ADSL Modem Router

NETGEAR

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April 2004

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Federal Communications Commission (FCC) Compliance Notice: Radio Frequency Notice

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Federal Communications Commission (FCC) Radiation Exposure Statement

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. In order to avoid the possibility of exceeding the FCC radio frequency exposure limits, human proximity to the antenna shall not be less than 20 cm (8 inches) during normal operation.

EN 55 022 Declaration of Conformance

This is to certify that the DG632 ADSL Modem Router is shielded against the generation of radio interference in accordance with the application of Council Directive 89/336/EEC, Article 4a. Conformity is declared by the application of EN 55 022 Class B (CISPR 22).

Bestätigung des Herstellers/Importeurs

Es wird hiermit bestätigt, daß das DG632 ADSL Modem Router gemäß der im BMPT-AmtsblVfg 243/1991 und Vfg 46/1992 aufgeführten Bestimmungen entstört ist. Das vorschriftsmäßige Betreiben einiger Geräte (z.B. Testsender) kann jedoch gewissen Beschränkungen unterliegen. Lesen Sie dazu bitte die Anmerkungen in der Betriebsanleitung.

Das Bundesamt für Zulassungen in der Telekommunikation wurde davon unterrichtet, daß dieses Gerät auf den Markt gebracht wurde und es ist berechtigt, die Serie auf die Erfüllung der Vorschriften hin zu überprüfen.

Certificate of the Manufacturer/Importer

It is hereby certified that the DG632 ADSL Modem Router has been suppressed in accordance with the conditions set out in the BMPT-AmtsblVfg 243/1991 and Vfg 46/1992. The operation of some equipment (for example, test transmitters) in accordance with the regulations may, however, be subject to certain restrictions. Please refer to the notes in the operating instructions.

Federal Office for Telecommunications Approvals has been notified of the placing of this equipment on the market and has been granted the right to test the series for compliance with the regulations.

Voluntary Control Council for Interference (VCCI) Statement

This equipment is in the second category (information equipment to be used in a residential area or an adjacent area thereto) and conforms to the standards set by the Voluntary Control Council for Interference by Data Processing Equipment and Electronic Office Machines aimed at preventing radio interference in such residential areas.

When used near a radio or TV receiver, it may become the cause of radio interference.

Read instructions for correct handling.

Customer Support

Refer to the Support Information Card that shipped with your DG632 ADSL Modem Router.

World Wide Web

NETGEAR maintains a World Wide Web home page that you can access at the universal resource locator (URL) <http://www.netgear.com>. A direct connection to the Internet and a Web browser such as Internet Explorer or Netscape are required.

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Glossary

Chapter 1

About This Manual

Congratulations on your purchase of the NETGEAR® DG632 ADSL Modem Router. This chapter introduces important features of this manual.

Audience, Conventions, Scope


This reference manual assumes that the reader has basic-to-intermediate computer and Internet skills. However, basic computer network, Internet, firewall, and networking technology tutorial information is provided in the appendices.

This guide uses the following typographical conventions:

Table 1. Typographical conventions

<i>italics</i>	Emphasis, books, CDs, URL names
bold	User input
mono space	Screen text, file and server names, extensions, commands, IP addresses


This guide uses the following formats to highlight special messages:

	Note: This format is used to highlight information of importance or special interest.
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This manual is written according to these specifications.

Table 1-1. Manual Specifications

Product Version	DG632 ADSL Modem Router
Manual Publication Date	April 2004

	Note: Product updates are available on the NETGEAR, Inc. Web site at http://kbserver.netgear.com/products/DG632.asp .
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How to Use this Manual

The HTML version of this manual includes a variety of navigation features as well as links to PDF versions of the full manual and individual chapters.

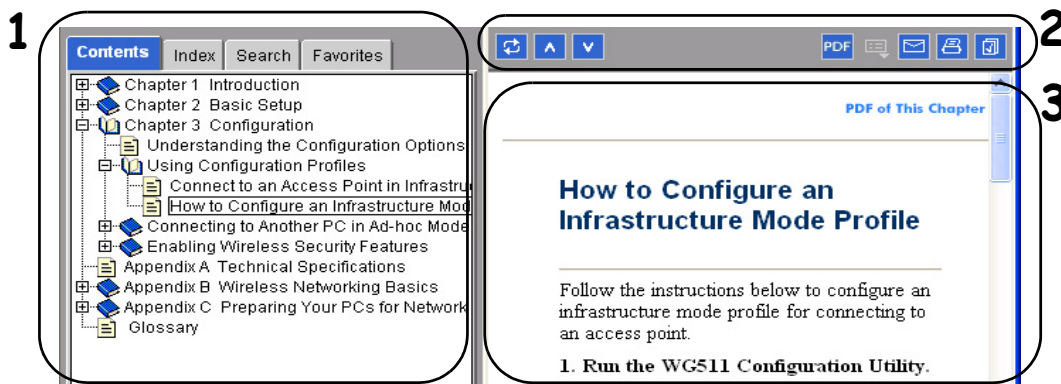


Figure Preface -2: HTML version of this manual

1. **Left pane.** Use the left pane to view the Contents, Index, Search, and Favorites tabs.

To view the HTML version of the manual, you must have a version 4 or later IE or Netscape browser with JavaScript enabled.

2. **Toolbar buttons.** Use the toolbar buttons across the top to navigate, print pages, and more.



The Show in Contents button locates the current topic in the Contents tab.



Previous/Next buttons display the previous or next topic.



The PDF button links to a PDF version of the full manual.




The Print button prints the current topic. Using this button when a step-by-step procedure is displayed will send the entire procedure to your printer. You do not have to worry about specifying the correct range of pages.


3. **Right pane.** Use the right pane to view the contents of the manual. Also, each page of the manual includes a [PDF of This Chapter](#) link at the top right which links to a PDF file containing just the currently selected chapter of the manual.

How to Print this Manual

To print this manual you may choose one of the following options, according to your needs:

- **Printing a “How To” Sequence of Steps in the HTML View.** Use the *Print* button  on the upper right of the toolbar to print the currently displayed topic. Using this button when a step-by-step procedure is displayed will send the entire procedure to your printer. You do not have to worry about specifying the correct range of pages.
- **Printing a Chapter.** Use the [PDF of This Chapter](#) link at the top right of any page.
 - Click the “PDF of This Chapter” link at the top right of any page in the chapter you want to print. The PDF version of the chapter you were viewing opens in a browser window.

Note: Your computer must have the free Adobe Acrobat reader installed in order to view and print PDF files. The Acrobat reader is available on the Adobe Web site at <http://www.adobe.com>.
 - Click the print icon in the upper left of the window.

Tip: If your printer supports printing two pages on a single sheet of paper, you can save paper and printer ink by selecting this feature.
- **Printing the Full Manual.** Use the PDF button in the toolbar at the top right of the browser window.
 - Click the PDF button  on the upper right of the toolbar. The PDF version of the chapter you were viewing opens in a browser window.
 - Click the print icon in the upper left of the window.

Tip: If your printer supports printing two pages on a single sheet of paper, you can save paper and printer ink by selecting this feature.

Chapter 2

Introduction

This chapter describes the features of the NETGEAR DG632 ADSL Modem Router. The DG632 modem router is a combination of a built-in ADSL modem, router, and firewall which enables your network to safely share an Internet connection that otherwise is used by a single computer.



Note: If you are unfamiliar with networking and routing, refer to [Appendix B, “Network and Routing Basics”](#) to become more familiar with the terms and procedures used in this manual.

About the Modem

The DG632 ADSL Modem Router provides continuous, high-speed 10/100 Ethernet access between your Ethernet devices. The DG632 modem router enables your network to share an Internet connection through the built-in ADSL modem that otherwise is used by a single computer. With minimum setup, you can install and use the modem within minutes.

The included firewall and Network Address Translation (NAT) features protect you from hackers.

Key Features

The DG632 modem router provides the following features:

- A powerful, true firewall
- Auto Sensing and Auto Uplink™ LAN Ethernet connections
- Extensive Internet protocol support
- Easy, Web-based setup for installation and management
- Direct connection to the Internet using the built-in ADSL modem
- USB connection to your computer eliminates the need for installing an Ethernet card
- Modem or Router Device Mode

- Modem Device Mode supports configuration of your Internet connection on your computer, and running software on your computer to log in to your ISP, if needed.
- Router Device Mode supports configuration of your Internet connection on your DG632 modem router, and can be configured to automatically log in to your ISP, if needed.

These features are discussed below.

Modem or Router Device Mode

The DG632 modem router can be set to operate in either Modem Device Mode or Router Device Mode.

Modem Device Mode

When set to operate in Modem Device Mode, your computer must be configured for whatever settings your ISP requires. Also, if your ISP uses software to establish your Internet connection, the DHCP spoofing feature will eliminate the need to run that software.

When DHCP spoofing is enabled, the modem obtains the actual Internet WAN IP address from the ISP during connection setup and forwards it to the attached computer.

Router Device Mode

In Router Device Mode, the DG632 supports configuration of the Transmission Control Protocol/Internet Protocol (TCP/IP) parameters and login functions on the modem.

The DG632 supports Transmission Control Protocol/Internet Protocol (TCP/IP) and Routing Information Protocol (RIP). [Appendix B, “Network and Routing Basics”](#) provides further information on TCP/IP.

- **Automatic Configuration of Attached PCs by DHCP**
The DG632 dynamically assigns network configuration information, including IP, modem, and domain name server (DNS) addresses, to attached PCs on the LAN using the Dynamic Host Configuration Protocol (DHCP). This feature greatly simplifies configuration of PCs on your local network.
- **DNS Proxy**
When DHCP is enabled and no DNS addresses are specified, the modem provides its own address as a DNS server to the attached PCs. The modem obtains actual DNS addresses from the ISP during connection setup and forwards DNS requests from the LAN.

- **Classical IP (RFC 1577)**
Some Internet service providers, in Europe for example, use Classical IP in their ADSL services. In such cases, the modem is able to use the Classical IP address from the ISP.
- **PPP over Ethernet (PPPoE)**
PPP over Ethernet is a protocol for connecting remote hosts to the Internet over an ADSL connection by simulating a dial-up connection. This feature eliminates the need to run a login program such as EnterNet or WinPOET on your computer.
- **PPP over ATM (PPPoA)**
PPP over ATM is a protocol for connecting remote hosts to the Internet over an ADSL connection by simulating an ATM connection.

A Powerful, True Firewall

Unlike simple Internet sharing NAT routers, the DG632 is a true firewall, using stateful packet inspection to defend against hacker attacks. Its firewall features include:

- **Denial of Service (DoS) protection**
Automatically detects and thwarts Denial of Service (DoS) attacks such as Ping of Death, SYN Flood, LAND Attack and IP Spoofing.
- **Blocks unwanted traffic from the Internet to your LAN.**
- **Blocks access from your LAN to Internet locations or services that you specify as off-limits.**
- **Logs security incidents**
The DG632 will log security events such as blocked incoming traffic, port scans, attacks, and administrator logins.

Auto Sensing and Auto Uplink™ LAN Ethernet Connections

The DG632 can connect to either a 10 Mbps standard Ethernet network or a 100 Mbps Fast Ethernet network. The local LAN port is autosensing and capable of full-duplex or half-duplex operation.

The modem incorporates Auto Uplink™ technology. The local Ethernet port will automatically sense whether the Ethernet cable plugged into the port should have a ‘normal’ connection such as to a computer or an ‘uplink’ connection such as to a switch or hub. That port will then configure itself to the correct configuration. This feature also eliminates the need to worry about crossover cables, as Auto Uplink will accommodate either type of cable to make the right connection.

Easy Installation and Management

You can install, configure, and operate the DG632 within minutes after connecting it to the network. The following features simplify installation and management tasks:

- **Browser-based management**
Browser-based configuration allows you to easily configure your modem from almost any type of personal computer, such as Windows, Macintosh, or Linux. A user-friendly Setup Wizard is provided and online help documentation is built into the browser-based Web Management Interface.
- **Smart Wizard**
The modem automatically senses the type of Internet connection, asking you only for the information required for your type of ISP account.
- **Diagnostic functions**
The modem incorporates built-in diagnostic functions such as Ping, and DNS lookup. These functions allow you to test Internet connectivity.
- **Visual monitoring**
The modem's front panel LEDs provide an easy way to monitor its status and activity.
- **Flash erasable programmable read-only memory (EPROM) for firmware upgrade**

What's In The Box?

The product package should contain the following items.

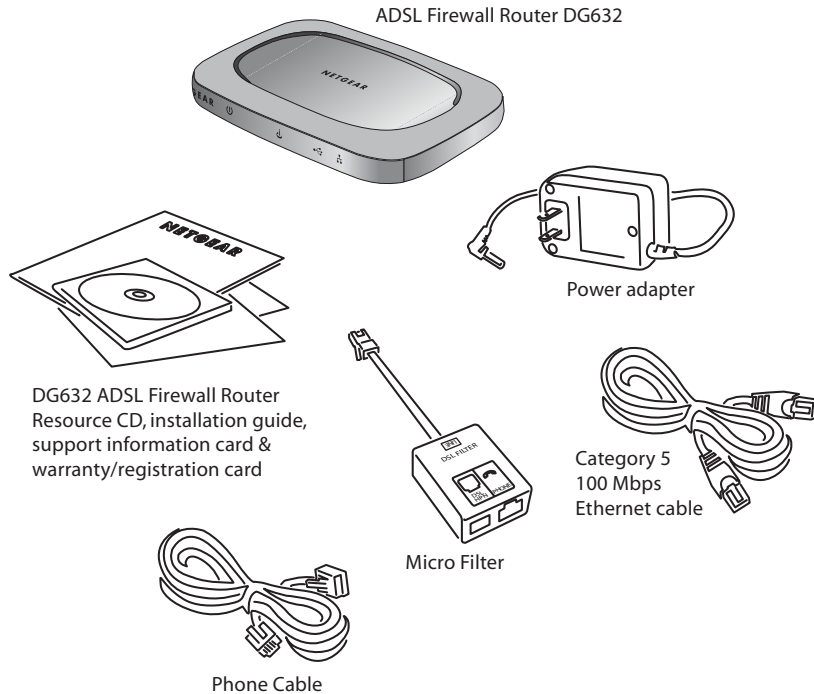


Figure 2-1: DG632 Package contents

- DG632 ADSL Modem Router
- AC power adapter (varies by region)
- Category 5 (Cat 5) Ethernet cable
- Microfilters (quantity and type vary by region)
- USB Cable (depending on the country of purchase)
- Telephone cable
- Microfilters (quantity and type vary by region)
- *ADSL Modem Router Resource CD*, including:
 - This guide
 - Application Notes

- *DG632 ADSL Modem Router Installation Guide*
- A Printed Quick Installation Guide
- Warranty and Support Information Cards

If any of the parts are incorrect, missing, or damaged, contact your NETGEAR dealer. Keep the carton, including the original packing materials, in case you need to return the router for repair.

The Front Panel

The DG632 ADSL Modem Router front panel shown below contains status LEDs.

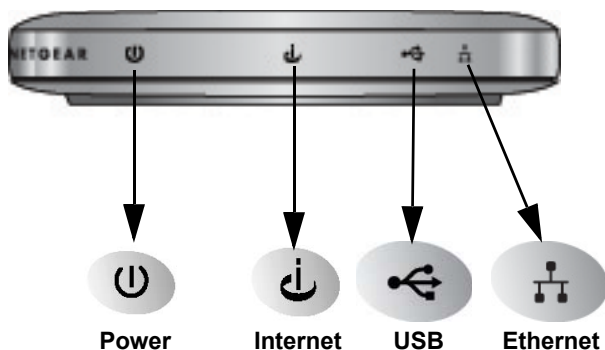


Figure 2-2: DG632 Front Panel

You can use the LEDs to verify various conditions. [Table 2-1](#) lists and describes each LED on the front panel of the modem. These LEDs are green when lit.

Table 2-1. LED Descriptions

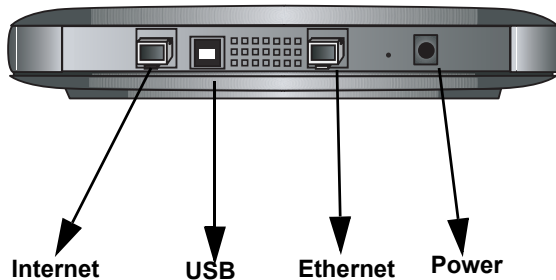
Label	Activity	Description
Power	On Off	Power is supplied to the modem. Power is not supplied to the modem.
Internet	Blink — Amber On — Green Blink — Green	Indicates ADSL training. The Internet port has detected a link with an attached device. Data is being transmitted or received by the Internet port.

Table 2-1. LED Descriptions

USB	On Off	The Local port has detected link with a device. No link is detected on this port.
Ethernet	On (Green) Blink (Green) On (Amber) Blink (Amber) Off	The Local port has detected link with a 100 Mbps device. Data is being transmitted or received at 100 Mbps. The Local port has detected link with a 10 Mbps device. Data is being transmitted or received at 10 Mbps. No link is detected on this port.

The Rear Panel

The rear panel of the DG632 ADSL Modem Router ([Figure 2-3](#)) contains port connections.

**Figure 2-3: DG632 Rear Panel**

Viewed from left to right, the rear panel contains the following elements:

- ADSL port for connecting to an ADSL line
- USB port for connecting to a local computer
- Ethernet RJ-45 port for connecting to a local computer
- Factory Default Reset push button
- AC power adapter outlet

Chapter 3

Connecting the Modem to the Internet

This chapter describes how to set up the modem on your Local Area Network (LAN) and connect to the Internet. It describes how to configure your DG632 ADSL Modem Router for Internet access using the Setup Wizard, or how to manually configure your Internet connection.

What You Need Before You Begin

You need to prepare these three things before you can establish an Internet connection through your modem:

1. The modem connected to an ADSL line and a computer properly connected to the modem as explained below.
2. Active Internet service such as that provided by an ADSL account.
3. The Internet Service Provider (ISP) configuration information for your DSL account.

ADSL Microfilter Requirements

ADSL technology uses the same wires as your telephone service. However, ADSL adds signals to the telephone lines which create noise in the telephone service. You must use ADSL microfilters to filter out these signals before they reach your telephone.

ADSL Microfilter

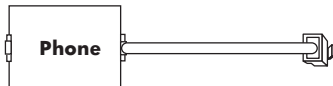


Figure 3-1: ADSL microfilter

Each device such as a telephone, fax machine, answering machine, or caller ID display will require an ADSL microfilter.

Note: Do not connect the DG632 to the ADSL line through a microfilter unless the microfilter is a combination microfilter/splitter specifically designed for this purpose. Doing so will prevent the built-in ADSL modem in the DG632 from establishing a connection to the Internet. If you have any doubts about this, connect the DG632 directly to the ADSL line.

ADSL Microfilter with Built-In Splitter

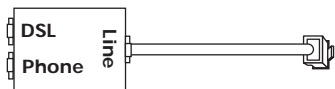


Figure 3-2: ADSL microfilter with built-in splitter

Use an ADSL microfilter with built-in splitter when there is a single wall outlet which must provide connectivity for both the DG632 and telephone equipment.

Computer Hardware Requirements

To use the DG632 modem router on your network, each computer must have an installed Ethernet adapter and an Ethernet cable.

To install and run the DG632 modem router with your computer, the computer must have an installed Ethernet Network Interface Card (NIC) and an Ethernet cable or an available USB port.

Ethernet Cabling Requirements

The DG632 modem router connects to your Ethernet LAN via twisted-pair cables. If the computer will connect to your network at 100 Mbps, you must use a Category 5 (CAT5) cable such as the one provided with your modem.

LAN Configuration Requirements

For the initial connection to the Internet and configuration of your modem, you need to connect a computer to the modem which is set to automatically get its TCP/IP configuration from the modem via DHCP.

Note: Please refer to [Appendix C, “Preparing Your Network”](#) for assistance with DHCP configuration.

Internet Configuration Requirements

Depending on how your ISP set up your Internet account, you need one or more of these configuration parameters to connect your modem to the Internet:

- Virtual Path Identifier (VPI)/Virtual Channel Identifier (VCI) parameters
- Multiplexing Method
- Host and Domain Names
- ISP Login Name and Password
- ISP Domain Name Server (DNS) Addresses
- Fixed or Static IP Address

Where Do I Get the Internet Configuration Parameters?

There are several ways you can gather the required Internet connection information.

- Your ISP should have provided you with all the information needed to connect to the Internet. If you cannot locate this information, you can ask your ISP to provide it or you can try one of the options below.
- If you have a computer already connected using the active Internet access account, you can gather the configuration information from that computer.
 - For Windows 95/98/ME, open the Network control panel, select the TCP/IP entry for the Ethernet adapter, and click Properties.
 - For Windows 2000/XP, open the Local Area Network Connection, select the TCP/IP entry for the Ethernet adapter, and click Properties.
 - For Macintosh computers, open the TCP/IP or Network control panel.
- You can also refer to the *ADSL Modem Router Resource CD* for the NETGEAR Router ISP Guide which provides Internet connection information for many ISPs.

Once you locate your Internet configuration parameters, you may want to record them on the page below according to the instructions in [“Record Your Internet Connection Information” on page 3-4](#).

Record Your Internet Connection Information

Print this page. Fill in the configuration parameters from your Internet Service Provider (ISP).

ISP Multiplexing Method and Virtual Circuit Number: The default settings of your DG632 ADSL Modem Router will work fine for most ISPs. However, some ISPs use a specific Multiplexing Method or a Virtual Circuit Number for either the Virtual Path Identifier (VPI) or Virtual Channel Identifier (VCI). If your ISP provided you with a specific Multiplexing Method or VPI/VCI number, then fill in the following:

Multiplexing Method, circle one: LLC-based or VC-based

VPI: _____ A number between 0 and 255. VCI: _____ A number between 1 and 65535.

ISP Login Name: The login name and password are case sensitive and must be entered exactly as given by your ISP. Some ISPs use your full e-mail address as the login name. The Service Name is not required by all ISPs. If you use a login name and password, then fill in the following:

Login Name: _____ Password: _____

Service Name: _____

Fixed or Static IP Address: If you have a static IP address, record the following information. For example, 169.254.141.148 could be a valid IP address.

Fixed or Static Internet IP Address: _____

Modem IP Address: _____

Subnet Mask: _____

ISP DNS Server Addresses: If you were given DNS server addresses, fill in the following:

Primary DNS Server IP Address: _____

Secondary DNS Server IP Address: _____

Host and Domain Names: Some ISPs use a specific host or domain name like **CCA7324-A** or **home**. If you did not get host or domain names, use the following examples as a guide:

- If your main e-mail account with your ISP is **aaa@yyy.com**, then use **aaa** as your host name. Your ISP might call this your account, user, host, computer, or system name.
- If your ISP's mail server is **mail.xxx.yyy.com**, then use **xxx.yyy.com** as the domain name.

ISP Host Name: _____ ISP Domain Name: _____

Connecting the DG632 to Your Network

This section provides instructions for connecting the DG632 modem router to your network.

Note: The Resource CD included with your modem contains an animated Installation Assistant to help you through this procedure.

How to Connect the Modem

There are three steps to connecting your firewall:

1. Connect the modem to your ADSL line.
2. Connect the modem to the computers on your network.
3. Log in to the modem.
4. Connect to the Internet.

Follow the steps below to connect your modem to your network. Before you begin, locate the ADSL configuration information from your Internet Service Provider (ISP).

1. CONNECT THE DG632 TO THE ADSL LINE.

- a. You need to install a filter on every telephone or device that shares the same phone number as your ADSL modem. Select the filter that came with your modem.

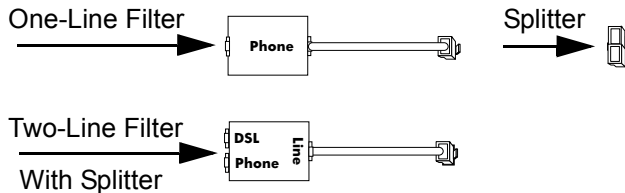


Figure 3-3: ADSL microfilters

Note: If you purchased the DG632 in a country where the filter is not included, you must acquire one.

- b. **Two-Line Filter Example.** Insert the two-line filter into the phone outlet and connect the phone to the phone line connector (A).

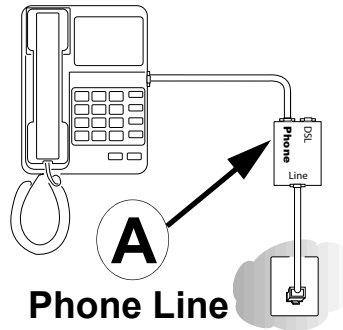


Figure 3-4: Connecting an ADSL microfilter and phone

Note: To use a one-line filter with a separate splitter, insert the splitter into the phone outlet, connect the one-line filter to the splitter, and connect the phone to the filter.

2. CONNECT THE DG632 TO THE INTERNET.

Note: Improperly connecting a filter to your DG632 modem router will block your ADSL connection.

- a. Turn off your computer.
- b. Connect the ADSL port of the DG632 to the ADSL port (B) of the two-line filter.

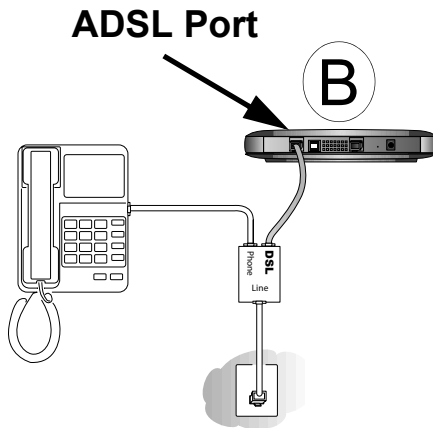


Figure 3-5: Connecting DG632 modem router to an ADSL microfilter and phone

- c. Connect the Ethernet cable (C) from your DG632's LAN port to the Ethernet adapter in your computer.

Note: To connect the computer using the USB port, please see [“Connecting Your Computer to the DG632 USB Port Option”](#) on page 3-12.

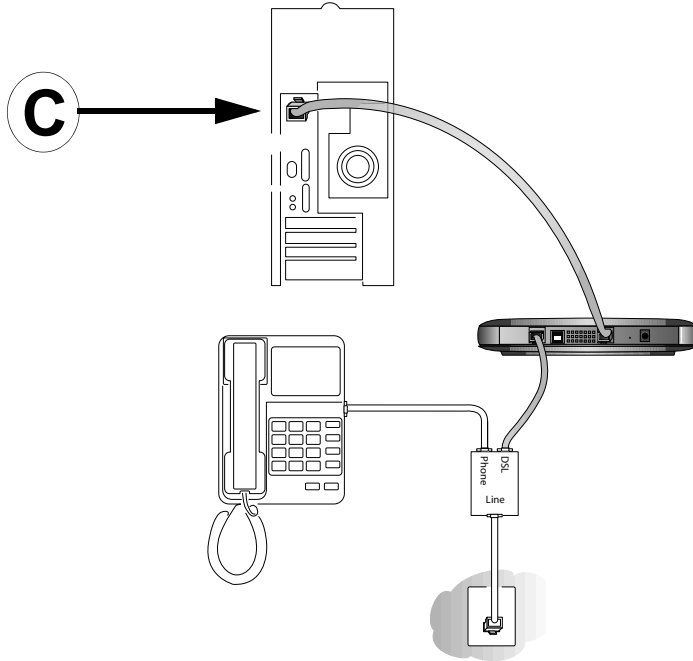





Figure 3-6: Connecting a computer to the DG632 modem router

Note: The DG632 modem router incorporates Auto Uplink™ technology. The Ethernet port will automatically sense whether the cable plugged into the port should have a 'normal' connection (for example, connecting to a computer) or an 'uplink' connection (for example, connecting to a switch or hub). That port will then configure itself to the correct configuration. This feature also eliminates the need to worry about crossover cables, as Auto Uplink will accommodate either type of cable to make the right connection.

- d. Connect the power adapter to the modem and plug it in to a power outlet. Verify the following:
 - Ⓧ The power light is lit after turning on the modem.

 The ADSL link light is solid green, indicating a link has been established to the ADSL network.

- e. Now, turn on your computer. If software usually logs you in to your Internet connection, do not run that software or cancel it if it starts automatically.

 or  The Ethernet or USB light is lit for the connected computer.

3. LOG IN TO THE DG632.

Note: Your computer needs to be configured for DHCP. For instructions on configuring for DHCP, please see Appendix C in the *Reference Manual on the ADSL Modem Router Resource CD*.

- a. Connect to the modem by typing <http://192.168.0.1> in the address field of Internet Explorer or Netscape® Navigator.



Figure 3-7: Log in to the modem

A login window opens as shown below:

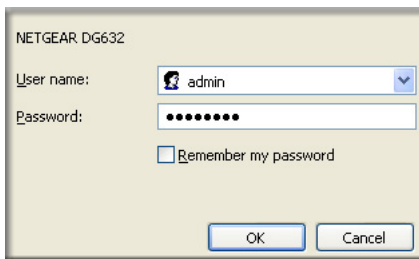


Figure 3-8: Login window

- b. When prompted, enter **admin** for the user name and **password** for the password, both in lower case letters. After logging in, you will see the menu below.

Figure 3-9: Setup Wizard



4. CONNECT TO THE INTERNET

The modem is now properly attached to your network. You are now ready to configure your modem to connect to the Internet. There are two ways you can configure your modem to connect to the Internet:

- a. Let the DG632 auto-detect the type of Internet connection you have and configure it.
- b. Manually choose which type of Internet connection you have and configure it.

These options are described below. In either case, unless your ISP automatically assigns your configuration automatically via DHCP, you need the configuration parameters from your ISP you recorded in [“Record Your Internet Connection Information”](#) on page 3-4.

Auto-Detecting Your Internet Connection Type

The Web Configuration Manager built in to the modem contains a Setup Wizard that can automatically determine your network connection type.

1. If your modem has not yet been configured, the Setup Wizard shown in [Figure 3-9](#) should launch automatically.

Note: If instead of the Setup Wizard menu, the main menu of the modem’s Configuration Manager appears, click the Setup Wizard link in the upper left to bring up this menu.

2. You must select a country and language.
3. Select Yes to allow the modem to automatically determine your connection.
4. Click Next.

The Setup Wizard will now check for the following connection types:

- Dynamic IP assignment
- A login protocol such as PPPoE or PPPoA

Next, the Setup Wizard will report which connection type it has discovered, and then display the appropriate configuration page. If the Setup Wizard finds no connection, you will be prompted to check the physical connection between your modem and the ADSL line. When the connection is properly made, the modem's Internet LED should be on.

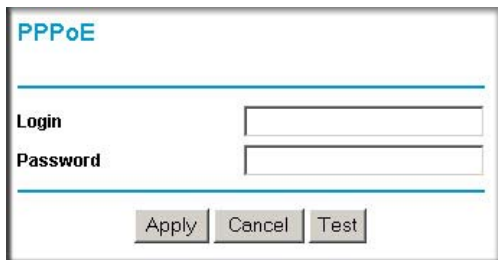
5. The ADSL settings for the multiplexing method and VPI/VCI will update with the preset defaults. The multiplexing method preset default settings will usually work. Only change the multiplexing method if you are sure your ISP requires Virtual Path Identifier (VPI) or Virtual Channel Identifier (VCI) settings that are different from the default values.

Incorrect VPI or VCI settings will prevent you from connecting to the Internet. To change these settings, click the ADSL Settings link on the main menu.

The procedures for filling in the configuration page for each type of connection follow below.

Wizard-Detected PPPoE Login Account Setup

If the Setup Wizard determines that your Internet service account uses a login protocol such as PPP over Ethernet (PPPoE), you will be directed to the PPPoE page shown in [Figure 3-10](#):



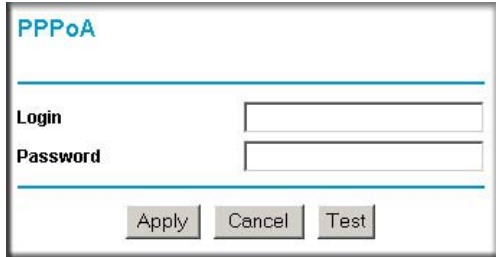
The screenshot shows a web-based configuration page for PPPoE. At the top left, the text 'PPPoE' is displayed in blue. Below this, there is a horizontal line. Underneath the line, there are two input fields. The first is labeled 'Login' and the second is labeled 'Password'. Below these input fields, there are three buttons: 'Apply', 'Cancel', and 'Test'.

Figure 3-10: Setup Wizard menu for PPPoE login accounts

Enter the PPPoE login user name and password.

Wizard-Detected PPPoA Login Account Setup

If the Setup Wizard determines that your Internet service account uses a login protocol such as PPP over ATM (PPPoA), you will be directed to the PPPoA page shown in [Figure 3-10](#) below:



The screenshot shows a window titled "PPPoA". Inside the window, there are two text input fields. The first is labeled "Login" and the second is labeled "Password". Below these fields are three buttons: "Apply", "Cancel", and "Test".

Figure 3-11: Setup Wizard menu for PPPoA login accounts

Enter your login user name and password. These fields are case sensitive.

Wizard-Detected Dynamic IP Account Setup

If the Setup Wizard determines that your Internet service account uses Dynamic IP assignment, you will be directed to the page shown in [Figure 3-12](#) below:



The screenshot shows a window titled "Dynamic IP Address". Inside the window, there is a message that says "No input data is required." followed by "Click 'Apply' to accept this connection method." Below this text are three buttons: "Apply", "Cancel", and "Test".

Figure 3-12: Setup Wizard menu for Dynamic IP address

Click Apply to set Dynamic IP as the connection method.

6. Click the Test button to test your Internet connection. If the NETGEAR Web site does not appear within one minute, refer to [Chapter 7, "Troubleshooting"](#).

Testing Your Internet Connection

After completing the Internet connection configuration, you can test your Internet connection. Log in to the modem, then, from the Basic Settings link in the Setup menu, click the Test button. If the NETGEAR Web site does not appear within one minute, refer to [Chapter 7, “Troubleshooting”](#).

Your modem is now configured to provide Internet access for your network. Your modem automatically connects to the Internet when one of your computers requires access. It is not necessary to run a dialer or login application such as Dial-Up Networking or Enternet to connect, log in, or disconnect. These functions are performed by the modem as needed.

To access the Internet from any computer connected to your modem, launch a browser such as Microsoft Internet Explorer or Netscape Navigator. You should see the modem’s Internet LED blink, indicating communication to the ISP. The browser should begin to display a Web page.

The following chapters describe how to configure the Advanced features of your modem, and how to troubleshoot problems that may occur.

Connecting Your Computer to the DG632 USB Port Option

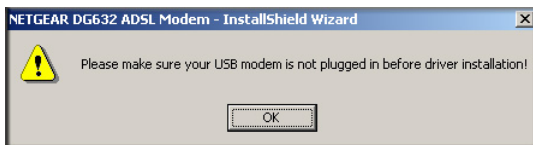
You can connect your PC to the USB 1.1 modem port of the DG632. To connect your computer to the modem via USB involves installing the USB driver:



Note: The USB connection option is only available for Windows PCs. Also, Windows 95 does not support USB without special operating system upgrades and patches.

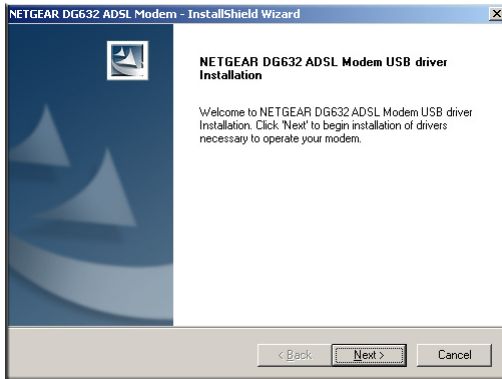
Follow these steps to install the USB driver.

1. Insert the CD which came with your modem into the CD drive of your computer.
2. Click the **Install USB Driver** button.



Be sure the DG632 is not plugged in before installing the software on your PC.

3. Click **Ok** to run the software installation utility.



4. Click **Next** and follow the prompts to complete the installation of the USB driver.
5. Now, connect the USB cable to your modem and plug in the AC power for the modem.
6. Use the USB cable to connect your computer to the modem.

The found new hardware Windows installation wizard will prompt you to complete the installation and inform you when the PC is ready to use the USB connection.

You have now finished connecting your DG632.

Chapter 4

Maintaining Your DG632 ADSL Modem Router

This chapter describes how to perform maintenance tasks with your DG632 ADSL Modem Router.

Changing the Mode of Operation

The DG632 ADSL Modem Router can operate in the following modes:

- **Modem:** In modem mode, you can connect a single computer to the Internet.
- **Router:** In router mode, you can connect more than one computer to the Internet and take advantage of advanced management and security features.

The modem includes a limited feature router to make the process of configuring your connection easier and more secure. You can change the operation of the modem from Modem Device Mode to Router Device Mode.

In Modem Device Mode, the modem operates like a DSL modem, passing all the Internet communications directly to your computer where you must then configure your settings and logon settings as needed.

In Router Device Mode, the modem provides limited router functionality which allows you to have the modem perform any logon steps your ISP may require. In this mode, it is also easier to configure your computer by taking advantage of the automatic configuration capabilities of DHCP which the router provides.

Follow these steps to change the DG632 mode of operation.



Note: If you change the modem from Router Mode to Modem Mode, your computer must be configured with a static IP address of 192.168.0.2-192.168.0.254, a Subnet Mask of 255.255.255.0, and a Gateway Address of 192.168.0.1 to be able to connect to the modem's built-in configuration pages.

1. Turn on the modem and wait at least ten seconds for initialization to complete.
2. Reboot your computer to obtain DHCP configuration from the modem.
3. Launch your web browser, and click your browser's Stop button.
4. In the Address or Location box of your browser, type **http://192.168.0.1** and click Enter.

A login window opens as shown in [Figure 4-1](#) below.:



Figure 4-1. Modem Login window

5. Type **admin** in the User Name box, **password** in the Password box, and click **OK**.
6. When the Basic Settings screen appears click **Device Mode** to this menu.

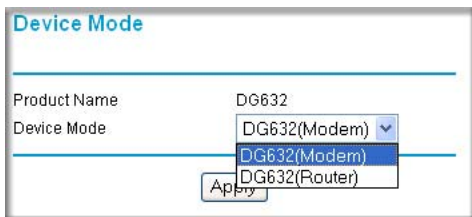
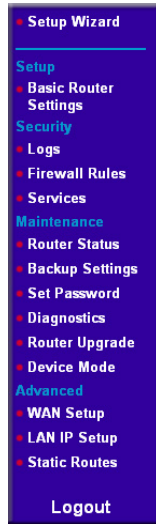


Figure 4-2. Device Type selection window

7. Select the mode.
8. Click **Apply** to save your changes.

After changing the mode, the main menu changes, showing the features of the mode selected.

Router Mode Menu



Modem Mode Menu

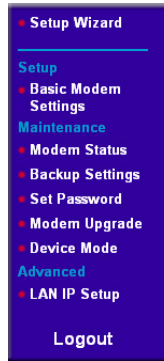


Figure 4-3. Device Mode main menu options

Changing the Password of Your DG632 ADSL Modem Router

For security reasons, the modem has its own user name and password. Also, after a period of inactivity for a set length of time, the administrator login will automatically disconnect. When prompted, enter **admin** for the modem User Name and **password** for the modem Password. You can use procedures below to change the modem's password and the amount of time for the administrator's login timeout.

Note: The user name and password are not the same as any user name or password you may use to log in to your Internet connection.

NETGEAR recommends that you change this password to a more secure password. The ideal password should contain no dictionary words from any language, and should be a mixture of both upper and lower case letters, numbers, and symbols. Your password can be up to 30 characters.

How to Change the Built-In Password

1. Log in to the modem at its default LAN address of `http://192.168.0.1` with its default User Name of **admin**, default password of **password**, or using whatever Password and LAN address you have chosen for the modem.



Figure 4-4: Log in to the modem

2. From the Main Menu of the browser interface, under the Maintenance heading, select Set Password to bring up the menu shown in [Figure 4-5](#).

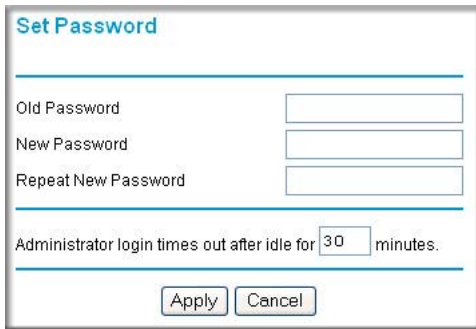
A screenshot of a web form titled "Set Password". The form has three input fields: "Old Password", "New Password", and "Repeat New Password". Below these fields, there is a line of text: "Administrator login times out after idle for 30 minutes." The number "30" is in a small input field. At the bottom of the form are two buttons: "Apply" and "Cancel".

Figure 4-5: Set Password menu

3. To change the password, first enter the old password, and then enter the new password twice.
4. Click Apply to save your changes.

Note: After changing the password, you will be required to log in again to continue the configuration. If you have backed up the modem settings previously, you should do a new backup so that the saved settings file includes the new password.

Changing the Administrator Login Timeout

For security, the administrator's login to the modem configuration will timeout after a period of inactivity. To change the login timeout period:

1. In the Set Password menu, type a number in 'Administrator login times out' field. The suggested default value is 5 minutes.

2. Click Apply to save your changes or click Cancel to keep the current period.

Backing Up, Restoring, or Erasing Your Settings

The configuration settings of the DG632 modem router are stored in a configuration file in the modem. This file can be backed up to your computer, restored, or reverted to factory default settings. The procedures below explain how to do these tasks.

How to Back Up the Configuration to a File

1. Log in to the modem at its default LAN address of `http://192.168.0.1` with its default User Name of **admin**, default password of **password**, or using whatever User Name, Password and LAN address you have chosen for the modem.
2. From the Maintenance heading of the Main Menu, select the Backup Settings menu as seen in Figure 4-6.

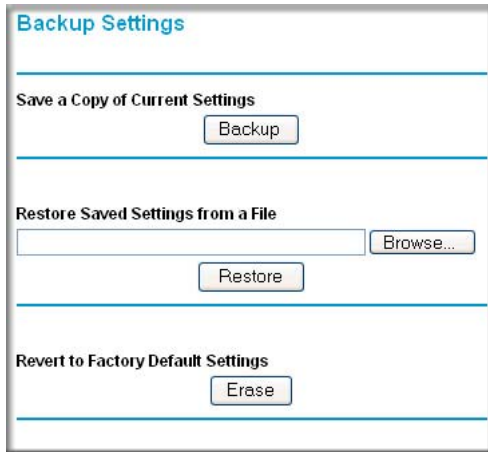


Figure 4-6: Backup Settings menu

3. Click Backup to save a copy of the current settings.
4. Store the `.cfg` file on a computer on your network.

How to Restore the Configuration from a File

1. Log in to the modem at its default LAN address of <http://192.168.0.1> with its default User Name of **admin**, default password of **password**, or using whatever User Name, Password and LAN address you have chosen for the modem.
2. From the Maintenance heading of the Main Menu, select the Settings Backup menu as seen in [Figure 4-6](#).
3. Enter the full path to the file on your network or click the Browse button to locate the file.
4. When you have located the `.cfg` file, click the Restore button to upload the file to the modem.
5. The modem will then reboot automatically.

How to Erase the Configuration

It is sometimes desirable to restore the modem to the factory default settings. This can be done by using the Erase function.

1. To erase the configuration, from the Maintenance menu Settings Backup link, click the Erase button on the screen.
2. The modem will then reboot automatically.

After an erase, the modem's password will be **password**, the LAN IP address will be 192.168.0.1, and the modem's DHCP client will be enabled.

Note: To restore the factory default configuration settings without knowing the login password or IP address, you must use the Default Reset button on the rear panel of the modem. See [“DG632 Rear Panel” on page 2-7](#).

Upgrading the Modem's Firmware

The software of the DG632 modem router is stored in FLASH memory, and can be upgraded as new software is released by NETGEAR.

Upgrade files can be downloaded from NETGEAR's Web site. If the upgrade file is compressed (.ZIP file), you must first extract the binary (.BIN or .IMG) file before uploading it to the modem.

How to Upgrade the Modem Firmware

Note: NETGEAR recommends that you back up your configuration before doing a firmware upgrade. After the upgrade is complete, you may need to restore your configuration settings.

1. Download and unzip the new software file from NETGEAR.

The Web browser used to upload new firmware into the modem must support HTTP uploads. NETGEAR recommends using Microsoft Internet Explorer 5.0 or above, or Netscape Navigator 4.7 or above.

2. Log in to the modem at its default LAN address of `http://192.168.0.1` with its default User Name of **admin**, default password of **password**, or using whatever User Name, Password and LAN address you have chosen for the modem.
3. From the Main Menu of the browser interface, under the Maintenance heading, select the **Modem Upgrade** heading to display this menu.



Figure 4-7: Modem Upgrade menu

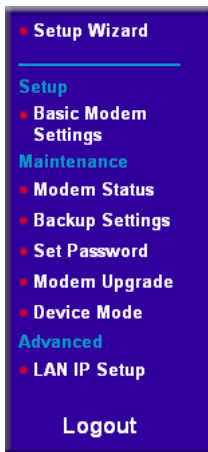
4. In the Modem Upgrade menu, click the **Browse** to locate the binary (.BIN or .IMG) upgrade file.
5. Click **Upload**.



Note: When uploading software to the modem, it is important not to interrupt the Web browser by closing the window, clicking a link, or loading a new page. If the browser is interrupted, it may corrupt the software. When the upload is complete, your modem will automatically restart. The upgrade process will typically take about one minute. In some cases, you may need to clear the configuration and reconfigure the modem after upgrading.

Chapter 5

Using Modem Mode



This chapter describes how to use the modem features of the DG632 ADSL Modem Router.

Figure 5-1: Modem Mode main menu

Modem Mode Basic Settings

You can manually configure your modem using the menu above, or you can allow the Setup Wizard to determine your configuration as described in the previous section.

Manually Configuring Basic Settings

It is best to start the manual configuration from the Setup Wizard:

1. Select your country.
2. Select No to manually configure your modem connection.
3. Click Next.
4. Manually configure the modem in the Basic Settings menu.

5. Follow the instructions below according to the encapsulation method and whether your Internet connection requires a login. The following methods are available:
 - Internet Connection Requires Login and Uses PPPoE
 - Internet Connection Requires Login and Uses PPPoA
 - Internet Connection Does Not Require a Login
6. Usually the default ADSL Settings work fine for most ISPs and you can skip this step. If you have any problems with your connection, check the ADSL Settings. See [“ADSL Settings“ on page 5-4](#) for more details.

Internet Connection Requires Login and Uses PPPoE

1. If your Internet connection *does* require login, select Yes and fill in the settings according to the instructions below.

Note: You will no longer need to launch the ISP’s login program on your computer in order to access the Internet. When you start an Internet application, your modem automatically logs you in.
2. Choose PPPoE for the encapsulation method your ISP uses.
3. Enter the login name (frequently the email address your ISP provided), password, and service name (if required).
4. If you want to change the login timeout, enter a new value in minutes. This determines how long the modem keeps the Internet connection active after there is no Internet activity from the LAN. Entering an Idle Timeout value of zero means never log out.
5. The DNS server is used to look up site addresses based on their names.
 - Select “Get Automatically from ISP” if your ISP uses DHCP to assign your IP address. Your ISP will automatically assign this address.
 - Select “Use These DNS Servers” if your ISP gave you one or two DNS addresses. Type the primary and secondary addresses.

Internet Connection Requires Login and Uses PPPoA

1. If your Internet connection *does* require login, select Yes and fill in the settings according to the instructions below.

Note: You will no longer need to launch the ISP's login program on your computer in order to access the Internet. When you start an Internet application, your modem automatically logs you in.

2. Choose PPPoA for the encapsulation method your ISP uses.
3. Enter the login name (frequently the email address your ISP provided), and password.
4. If you want to change the login timeout, enter a new value in minutes. This determines how long the modem keeps the Internet connection active after there is no Internet activity from the LAN. Entering an Idle Timeout value of zero means never log out.
5. Internet IP Address:
 - Select "Get Dynamically from ISP" if your ISP uses DHCP to assign your IP address. Your ISP will automatically assign these addresses.
 - Select "Use Static IP Address" if your ISP has assigned you a permanent, fixed (static) IP address. Enter the IP address that your ISP assigned.
6. The DNS server is used to look up site addresses based on their names.
 - Select "Get Automatically from ISP" if your ISP uses DHCP to assign your IP address. Your ISP will automatically assign this address.
 - Select "Use These DNS Servers" if your ISP has assigned you DNS server addresses. Enter the Primary and Secondary DNS server addresses that your ISP provided.

Internet Connection Does Not Require A Login

1. If your Internet connection does *not* require a login, select No and fill in the settings according to the instructions below.
2. Enter your Account Name (may also be called Host Name) and Domain Name. These parameters may be necessary to access your ISP's mail or news servers.
3. Internet IP Address:
 - Select "Get Dynamically from ISP" if your ISP uses DHCP to assign your IP address. Your ISP will automatically assign these addresses.
 - Select "Use Static IP Address" if your ISP has assigned you a permanent, fixed (static) IP address. Enter the IP address that your ISP assigned. Also enter the IP Subnet Mask and the Gateway IP Address. The gateway is the ISP's modem to which your modem will connect.
4. Domain Name Server (DNS) Address:

- Select “Get Dynamically from ISP” if your ISP uses DHCP to assign your IP address. Your ISP will automatically assign this address.
- If you know that your ISP does not automatically transmit DNS addresses to the modem during login, select “Use these DNS servers” and enter the IP address of your ISP’s Primary DNS Server. If a Secondary DNS Server address is available, enter it also.

A DNS server is a host on the Internet that translates Internet names (such as www.netgear.com) to numeric IP addresses. Typically your ISP transfers the IP address of one or two DNS servers to your modem during login. If the ISP does not transfer an address, you must obtain it from the ISP and enter it manually here.

5. Click Apply to save your settings.
6. Click the Test button to test your Internet connection.
If the NETGEAR Web site does not appear within one minute, refer to [Chapter 7, “Troubleshooting”](#).

ADSL Settings

The default settings of your DG632 ADSL Modem Router will work fine for most ISPs. However, some ISPs use a specific Multiplexing Method or a Virtual Circuit Number for either the Virtual Path Identifier (VPI) or Virtual Channel Identifier (VCI).

Note: The correct country must be selected from the Setup Wizard’s first page for the default ADSL Settings to work.

If your ISP provided you with a specific Multiplexing Method or VPI/VCI number, then fill in the following:

1. Select the ADSL Settings link from the main menu.
2. For the Multiplexing Method, select LLC-based or VC-based.
3. Type a number between 0 and 255 for the VPI. The default is 8.
4. Type a number between 1 and 65535 for the VCI. The default is 35.
5. Click Apply.

Modem Mode Network Management Information

The DG632 provides a variety of status and usage information which is discussed below.

Viewing Modem Status and Usage Statistics

From the Main Menu, under Maintenance, select Modem Status to view the screen in [Figure 5-2](#).

The screenshot shows the 'Modem Status' screen with the following information:

```

Modem Status
-----
Account Name      mygateway
Firmware Version  V3.3.0a_bs
-----
ADSL Port
MAC Address       00:09:5B:A5:77:2F
IP Address        -
Gateway IP       -
DHCP              -
IP Subnet Mask    -
Domain Name Server -
-----
LAN Port
MAC Address       00:09:5B:A5:77:2D
IP Address        192.168.0.1
DHCP              On
IP Subnet Mask    255.255.255.0
-----
Modem
ADSL Firmware Version 0.49
Modem Status          Disconnected
Connect Mode          -
Down Stream           -
Up Stream             -
VPI                   0
VCI                   0
-----
[ Show Statistics ] [ Connection Status ]
  
```

Figure 5-2: Modem Status screen

The Modem Status menu provides status and usage information, as described in the following table.

Table 5-1. Menu 3.2 - Modem Status Fields

Field	Description
Account Name	The Host Name assigned to the modem in the Basic Settings menu.
Firmware Version	Displays the modem firmware version.
ADSL Port	These parameters apply to the Internet (ADSL) port of the modem.
MAC Address	Displays the Ethernet MAC address being used by the Internet (ADSL) port of the modem.
IP Address	Displays the IP address being used by the Internet (ADSL) port of the modem. If no address is shown, the modem cannot connect to the Internet.

Table 5-1. Menu 3.2 - Modem Status Fields

Field	Description
DHCP	If None, the modem will use a fixed IP address on the ADSL. If Client, the modem will obtain an IP address dynamically from the ISP
IP Subnet Mask	Displays the IP Subnet Mask being used by the Internet (ADSL) port of the modem.
Domain Name Server (DNS)	Displays the DNS Server IP addresses being used by the modem. These addresses are usually obtained dynamically from the ISP.
LAN Port	These parameters apply to the Local (ADSL) port of the modem.
MAC Address	Displays the Ethernet MAC address of the Local (LAN) port.
IP Address	This field displays the IP address being used by the Local (LAN) port of the modem. The default is 192.168.0.1
DHCP	If OFF, the modem will not assign IP addresses to PCs on the LAN. If ON, the modem will assign IP addresses to PCs on the LAN.
IP Subnet Mask	This field displays the IP Subnet Mask being used by the Local (LAN) port of the modem. The default is 255.255.255.0.
Modem	These parameters apply to the Local (WAN) port of the modem.
ADSL Firmware Version	The version of the firmware.
Router Status	The connection status of the modem.
Connect Mode	This field displays the protocol used to connect to your service provider. When the ADSL link comes up, the connection will be either "Fast" or "Interleaved", depending on the way the telephone company has configured its equipment.
Downstream Speed	The speed at which the modem is receiving data from the ADSL line.
Upstream Speed	The speed at which the modem is transmitting data to the ADSL line.
VPI	The Virtual Path Identifier setting.
VCI	The Virtual Channel Identifier setting.

Click the Show Statistics button to display modem usage statistics, as shown in [Figure 5-2](#) below:

System Up Time: 0:20							
Port	Status	TxPkts	RxPkts	Collisions	Tx B/s	Rx B/s	Up Time
WAN	-	0	0	-	0	0	-
LAN	100/Full	158	208	0	38861	28572	0
USB	disconnected	0	0	-	0	0	

Poll Interval: (secs)

Figure 5-3: Modem Statistics screen

This screen shows the following statistics:.

Table 5-1. Statistics Fields

Field	Description
WAN, LAN, or Serial Port	The statistics for the WAN (Internet), LAN (local), and Serial ports. For each port, the screen displays:
Status	The link status of the port.
TxPkts	The number of packets transmitted on this port since reset or manual clear.
RxPkts	The number of packets received on this port since reset or manual clear.
Collisions	The number of collisions on this port since reset or manual clear.
Tx B/s	The current line utilization—percentage of current bandwidth used on this port.
Rx B/s	The average line utilization for this port.
Up Time	The time elapsed since the last power cycle or reset.
Poll Interval	Specifies the interval at which the statistics are updated in this window. Click Stop to freeze the display.

Chapter 6

Using Router Mode

This chapter describes how to use the basic router features of the DG632 ADSL Modem Router.

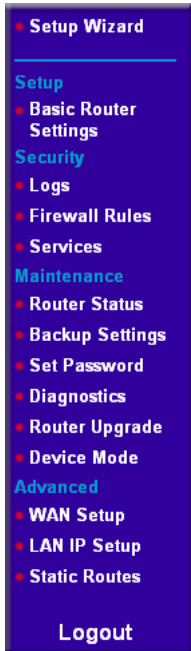


Figure 6-1: Router Mode main menu

Router Mode Basic Settings

You can manually configure your modem using the menu above, or you can allow the Setup Wizard to determine your configuration as described in the previous section.

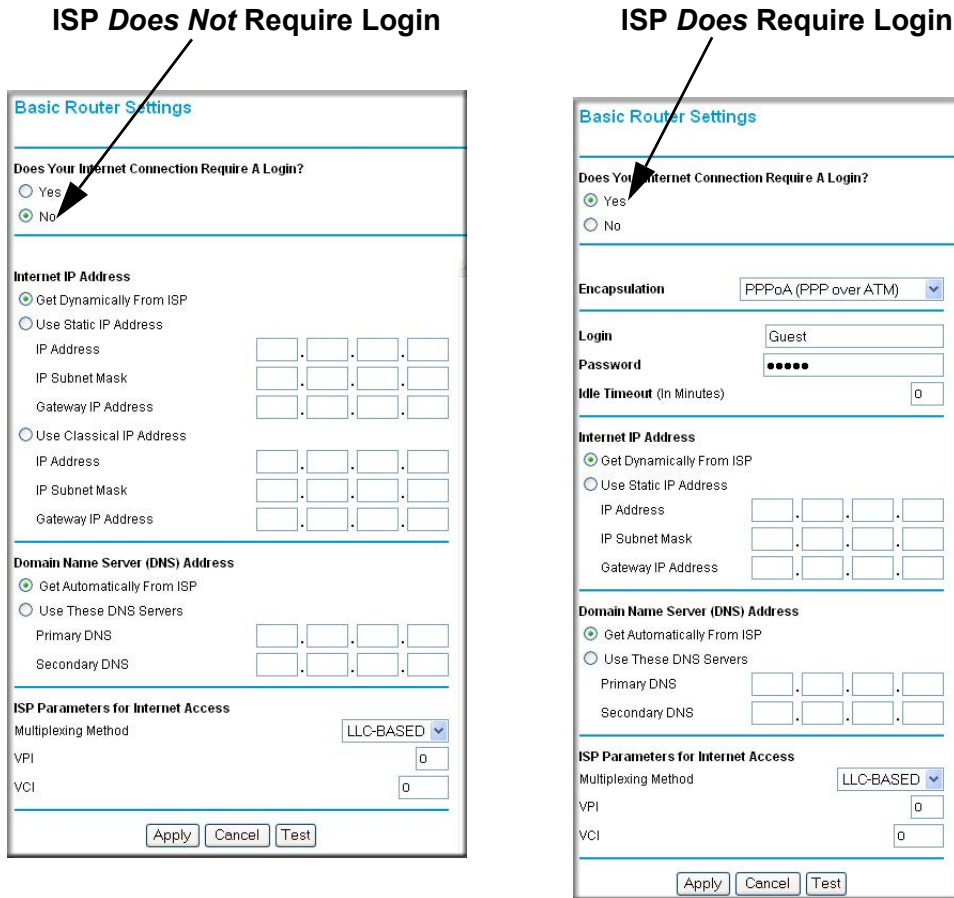


Figure 6-2: Basic Settings menu

Manually Configuring Basic Settings

It is best to start the manual configuration from the Setup Wizard:

1. Select your country.
2. Select No to manually configure your modem connection.
3. Click Next.
4. Manually configure the modem in the Basic Settings menu shown in [Figure 6-2](#).

5. Follow the instructions below according to the encapsulation method and whether your Internet connection requires a login. The following methods are available:
 - Internet Connection Requires Login and Uses PPPoE
 - Internet Connection Requires Login and Uses PPPoA
 - Internet Connection Does Not Require a Login
6. Usually the default ADSL Settings work fine for most ISPs and you can skip this step. If you have any problems with your connection, check the ADSL Settings. See [“ADSL Settings“ on page -5](#) for more details.

Internet Connection Requires Login and Uses PPPoE

1. If your Internet connection *does* require login, select Yes and fill in the settings according to the instructions below.

Note: You will no longer need to launch the ISP’s login program on your computer in order to access the Internet. When you start an Internet application, your modem automatically logs you in.
2. Choose PPPoE for the encapsulation method your ISP uses.
3. Enter the login name (frequently the email address your ISP provided), password, and service name (if required).
4. If you want to change the login timeout, enter a new value in minutes. This determines how long the modem keeps the Internet connection active after there is no Internet activity from the LAN. Entering an Idle Timeout value of zero means never log out.
5. The DNS server is used to look up site addresses based on their names.
 - Select “Get Automatically from ISP” if your ISP uses DHCP to assign your IP address. Your ISP will automatically assign this address.
 - Select “Use These DNS Servers” if your ISP gave you one or two DNS addresses. Type the primary and secondary addresses.

Internet Connection Requires Login and Uses PPPoA

1. If your Internet connection *does* require login, select Yes and fill in the settings according to the instructions below.

Note: You will no longer need to launch the ISP's login program on your computer in order to access the Internet. When you start an Internet application, your modem automatically logs you in.

2. Choose PPPoA for the encapsulation method your ISP uses.
3. Enter the login name (frequently the email address your ISP provided), and password.
4. If you want to change the login timeout, enter a new value in minutes. This determines how long the modem keeps the Internet connection active after there is no Internet activity from the LAN. Entering an Idle Timeout value of zero means never log out.
5. Internet IP Address:
 - Select "Get Dynamically from ISP" if your ISP uses DHCP to assign your IP address. Your ISP will automatically assign these addresses.
 - Select "Use Static IP Address" if your ISP has assigned you a permanent, fixed (static) IP address. Enter the IP address that your ISP assigned.
6. The DNS server is used to look up site addresses based on their names.
 - Select "Get Automatically from ISP" if your ISP uses DHCP to assign your IP address. Your ISP will automatically assign this address.
 - Select "Use These DNS Servers" if your ISP has assigned you DNS server addresses. Enter the Primary and Secondary DNS server addresses that your ISP provided.

Internet Connection Does Not Require A Login

1. If your Internet connection does *not* require a login, select No and fill in the settings according to the instructions below.
2. Enter your Account Name (may also be called Host Name) and Domain Name. These parameters may be necessary to access your ISP's mail or news servers.
3. Internet IP Address:
 - Select "Get Dynamically from ISP" if your ISP uses DHCP to assign your IP address. Your ISP will automatically assign these addresses.
 - Select "Use Static IP Address" if your ISP has assigned you a permanent, fixed (static) IP address. Enter the IP address that your ISP assigned. Also enter the IP Subnet Mask and the Gateway IP Address. The gateway is the ISP's modem to which your modem will connect.
4. Domain Name Server (DNS) Address:

- Select “Get Dynamically from ISP” if your ISP uses DHCP to assign your IP address. Your ISP will automatically assign this address.
- If you know that your ISP does not automatically transmit DNS addresses to the modem during login, select “Use these DNS servers” and enter the IP address of your ISP’s Primary DNS Server. If a Secondary DNS Server address is available, enter it also.

A DNS server is a host on the Internet that translates Internet names (such as www.netgear.com) to numeric IP addresses. Typically your ISP transfers the IP address of one or two DNS servers to your modem during login. If the ISP does not transfer an address, you must obtain it from the ISP and enter it manually here.

5. Click Apply to save your settings.
6. Click the Test button to test your Internet connection.
If the NETGEAR Web site does not appear within one minute, refer to [Chapter 7, “Troubleshooting”](#).

ADSL Settings

The default settings of your DG632 ADSL Modem Router will work fine for most ISPs. However, some ISPs use a specific Multiplexing Method or a Virtual Circuit Number for either the Virtual Path Identifier (VPI) or Virtual Channel Identifier (VCI).

Note: The correct country must be selected from the Setup Wizard’s first page for the default ADSL Settings to work.

If your ISP provided you with a specific Multiplexing Method or VPI/VCI number, then fill in the following:

1. Select the ADSL Settings link from the main menu.
2. For the Multiplexing Method, select LLC-based or VC-based.
3. Type a number between 0 and 255 for the VPI. The default is 8.
4. Type a number between 1 and 65535 for the VCI. The default is 35.
5. Click Apply.

Router Mode Network Management Information

The DG632 provides a variety of status and usage information which is discussed below.

Viewing Router Status and Usage Statistics

From the Main Menu, under Maintenance, select Router Status to view the screen in [Figure 6-3](#).

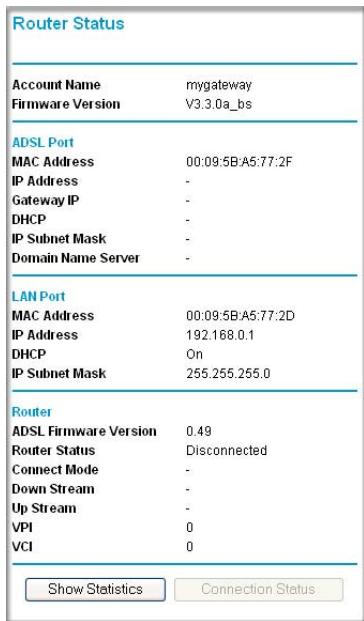


Figure 6-3: Router Status screen

The Router Status menu provides status and usage information, as described in the following table.

Table 6-1. Menu 3.2 - Modem Status Fields

Field	Description
Account Name	The Host Name assigned to the modem in the Basic Settings menu.
Firmware Version	Displays the modem firmware version.
ADSL Port	These parameters apply to the Internet (ADSL) port of the modem.
MAC Address	Displays the Ethernet MAC address being used by the Internet (ADSL) port of the modem.
IP Address	Displays the IP address being used by the Internet (ADSL) port of the modem. If no address is shown, the modem cannot connect to the Internet.

Table 6-1. Menu 3.2 - Modem Status Fields

Field	Description
DHCP	If None, the modem will use a fixed IP address on the ADSL. If Client, the modem will obtain an IP address dynamically from the ISP
IP Subnet Mask	Displays the IP Subnet Mask being used by the Internet (ADSL) port of the modem.
Domain Name Server (DNS)	Displays the DNS Server IP addresses being used by the modem. These addresses are usually obtained dynamically from the ISP.
LAN Port	These parameters apply to the Local (ADSL) port of the modem.
MAC Address	Displays the Ethernet MAC address of the Local (LAN) port.
IP Address	This field displays the IP address being used by the Local (LAN) port of the modem. The default is 192.168.0.1
DHCP	If OFF, the modem will not assign IP addresses to PCs on the LAN. If ON, the modem will assign IP addresses to PCs on the LAN.
IP Subnet Mask	This field displays the IP Subnet Mask being used by the Local (LAN) port of the modem. The default is 255.255.255.0.
Router	These parameters apply to the Local (WAN) port of the modem.
ADSL Firmware Version	The version of the firmware.
Router Status	The connection status of the modem.
Connect Mode	This field displays the protocol used to connect to your service provider. When the ADSL link comes up, the connection will be either "Fast" or "Interleaved", depending on the way the telephone company has configured its equipment.
Downstream Speed	The speed at which the modem is receiving data from the ADSL line.
Upstream Speed	The speed at which the modem is transmitting data to the ADSL line.
VPI	The Virtual Path Identifier setting.
VCI	The Virtual Channel Identifier setting.

Click the Show Statistics button to display modem usage statistics, as shown in [Figure 6-3](#) below:

System Up Time:2:2							
Port	Status	TxPkts	RxPkts	Collisions	Tx B/s	Rx B/s	Up Time
WAN	-	0	0	-	0	0	-
LAN	100/Full	1444	1326	0	667053	175385	0
USB	disconnected	0	0	-	0	0	

Poll Interval : (secs)

Figure 6-4: Router Statistics screen

This screen shows the following statistics:.

Table 6-1. Statistics Fields

Field	Description
WAN, LAN, or Serial Port	The statistics for the WAN (Internet), LAN (local), and Serial ports. For each port, the screen displays:
Status	The link status of the port.
TxPkts	The number of packets transmitted on this port since reset or manual clear.
RxPkts	The number of packets received on this port since reset or manual clear.
Collisions	The number of collisions on this port since reset or manual clear.
Tx B/s	The current line utilization—percentage of current bandwidth used on this port.
Rx B/s	The average line utilization for this port.
Up Time	The time elapsed since the last power cycle or reset.
Poll Interval	Specifies the interval at which the statistics are updated in this window. Click Stop to freeze the display.

Click the Connection Status button to display router connection status, as shown in [Figure 6-5](#) and [Figure 6-6](#).

Connection Status	
IP Address	192.168.2.54
Subnet Mask	255.255.255.0
Default Gateway	192.168.2.1
DHCP Server	192.168.2.54
DNS Server	66.125.125.214
Lease Obtained	2003-08-27 08:09:58
Lease Expires	2003-08-26 23:37:32

Release Renew

Close Window

Figure 6-5: Connection Status screen for Dynamic IP

Clicking the Renew button updates the status information.

This screen shows the following statistics:

Table 6-1. Connection Status Fields for Dynamic IP

Field	Description
IP Address	The IP Address assigned to the WAN port by the ADSL Internet Service Provider.
Subnet Mask	Then Network Mask assigned to the WAN port by the ADSL Internet Service Provider.
Default Gateway	Then default gateway modem assigned to the WAN port by the ADSL Internet Service Provider.
DHCP Server	The DHCP server's IP address.
DNS Server	The DNS server's IP address.
Lease Obtained	Date and time the lease was obtained.
Lease Expires	Date and time the lease expires.

An alternate view of the Connection Status screen is shown in [Figure 6-6](#) below:

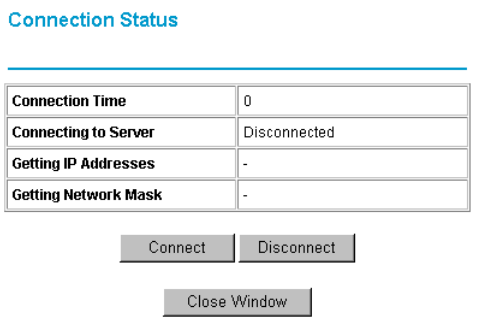


Figure 6-6: Connection Status screen for PPPoA

Clicking the Renew button updates the status information.

This screen shows the following statistics:

Table 6-1. Connection Status Fields for PPPoA

Field	Description
Connection Time	The time elapsed since the last connection to the Internet via the ADSL port.
Connection Method	The method the ADSL port acquired its TCP/IP configuration.
IP Address	The IP Address assigned to the WAN port by the ADSL Internet Service Provider.
Network Mask	Then Network Mask assigned to the WAN port by the ADSL Internet Service Provider.

Viewing, Selecting, and Saving Router Mode Logged Information

The modem will log security-related events such as denied incoming service requests, hacker probes, and administrator logins.

Here is an example of the logs file.

Logs

Current time:

```
00:00:00 Valid Configuration Tree
00:00:04 Firewall NAT service started
00:00:04 USB interface is being brought up
00:00:04 Bridge Created: br0
00:00:05 USB Interface Successfully Brought Up
00:00:05 Bridge Interface Added: eth0
00:00:05 Bridge Interface Added: usbrndis
```

Syslog

Add an IP Address: . . .

Select a logging destination:

Figure 6-7: Security Logs menu

Log entries are described in [Table 6-1](#) below:

Table 6-1. Security Log entry descriptions

Field	Description
Description or Action	The type of event and what action was taken if any.
Source IP	The IP address of the initiating device for this log entry.
Source port and interface	The service port number of the initiating device, and whether it originated from the LAN or WAN
Destination	The name or IP address of the destination device or Web site.
Destination port and interface	The service port number of the destination device, and whether it's on the LAN or WAN.

Log action buttons are described in [Table 6-2](#)

Table 6-2. Security Log action buttons

Field	Description
Refresh	Refresh the log screen.
Clear Log	Clear the log entries.
Remove (logging destination)	Remove a logging destination from the list.

Selecting What Information to Log

Besides the standard information listed above, you can choose to log additional information. Those optional selections are as follows:

- Attempted access to blocked site
- Connections to the Web-based interface of the modem
- Modem operation (start up, get time, etc.)
- Known DoS attacks and Port Scans

Saving Log Files on a Server

You can choose to write the logs to a computer running a syslog program. To activate this feature, enter the IP address of the server where the Syslog file will be written.

Router Mode Diagnostic Utilities and Rebooting

The DG632 modem router has a diagnostics feature. You can use the diagnostics menu to perform the following functions from the modem:

- Ping an IP Address to test connectivity to see if you can reach a remote host.
- Perform a DNS Lookup to test if an Internet name resolves to an IP address to verify that the DNS server configuration is working.
- Display the Routing Table to identify what other modems the modem is communicating with.
- Reboot the modem to enable new network configurations to take effect or to clear problems with the modem's network connection.

From the Main Menu of the browser interface, under the Maintenance heading, select the Modem Diagnostics heading to display the menu shown in [Figure 6-8](#).

The screenshot shows a web interface titled "Diagnostics" with a blue header. It is divided into four sections by horizontal lines:

- Ping an IP address:** A form with four input boxes for IP address digits and a "Ping" button.
- Perform a DNS Lookup:** A form with an "Internet Name:" input box and a "Lookup" button. Below it are labels for "IP address:" and "DNS Server:" without input fields.
- Display the Routing Table:** A form with a "Display" button.
- Reboot the Modem:** A form with a "Reboot" button.

Figure 6-8: Diagnostics menu

Firewall Services

Services are functions performed by server computers at the request of client computers. For example, Web servers serve Web pages, time servers serve time and date information, and game hosts serve data about other players' moves. When a computer on the Internet sends a request for service to a server computer, the requested service is identified by a service or port number. This number appears as the destination port number in the transmitted IP packets. For example, a packet that is sent with destination port number 80 is an HTTP (Web server) request.

The service numbers for many common protocols are defined by the Internet Engineering Task Force (IETF) and published in RFC1700, "Assigned Numbers." Service numbers for other applications are typically chosen from the range 1024 to 65535 by the authors of the application.

Although the DG632 already holds a list of many service port numbers, you are not limited to these choices. Use the procedure below to create your own service definitions.

How to Define Services

1. Log in to the modem at its default LAN address of `http://192.168.0.1` with its default User Name of **admin**, default password of **password**, or using whatever Password and LAN address you have chosen for the modem.
2. Select the Services link of the Security menu to display the Services menu shown in [Figure 6-9](#):



Figure 6-9: Services menu

- To create a new Service, click the Add Custom Service button.
- To edit an existing Service, select its button on the left side of the table and click Edit Service.

- To delete an existing Service, select its button on the left side of the table and click Delete Service.

3. Use the page shown below to define or edit a service.

Services

Service Definition

Name

Protocol

Port Start

Port End

Figure 6-10: Add Services menu

4. Click Apply to save your changes.

Firewall Rules

Firewall rules are used to block or allow specific traffic passing through from one side to the other. Inbound rules (WAN to LAN) restrict access by outsiders to private resources, selectively allowing only specific outside users to access specific resources. Outbound rules (LAN to WAN) determine what outside resources local users can have access to.

A firewall has two default rules, one for inbound traffic and one for outbound. The default rules of the DG632 are:

- Inbound: Block all access from outside except responses to requests from the LAN side.
- Outbound: Allow all access from the LAN side to the outside.

You can define additional rules that will specify exceptions to the default rules. By adding custom rules, you can block or allow access based on the service or application, source or destination IP addresses, and time of day. You can also choose to log traffic that matches or does not match the rule you have defined.

To access the rules configuration of the DG632, click the Firewall Rules link on the main menu, then click Add for either an Outbound or Inbound Service.

Firewall Rules

Outbound Services

#	Host IP Address	Service Name	Protocol	Port Start - End

Add Delete

Inbound Services

#	LAN Server IP Address	Service Name	Protocol	Port Start - End

Add Delete

Figure 6-11: Rules menu

- To edit an existing rule, select its button on the left side of the table and click Edit.
- To delete an existing rule, select its button on the left side of the table and click Delete.

Inbound Rules (Port Forwarding)

Because the DG632 uses Network Address Translation (NAT), your network presents only one IP address to the Internet, and outside users cannot directly address any of your local computers. However, by defining an inbound rule you can make a local server (for example, a Web server or game server) visible and available to the Internet. The rule tells the modem to direct inbound traffic for a particular service to one local server based on the destination port number. This is also known as port forwarding.



Note: Some residential broadband ISP accounts do not allow you to run any server processes (such as a Web or FTP server) from your location. Your ISP may periodically check for servers and may suspend your account if it discovers any active services at your location. If you are unsure, refer to the Acceptable Use Policy of your ISP.

Remember that allowing inbound services opens holes in your firewall. Only enable those ports that are necessary for your network. Following are two application examples of inbound rules:

Inbound Rule Example: A Local Public Web Server

If you host a public Web server on your local network, you can define a rule to allow inbound Web (HTTP) requests to the IP address of your Web server. This rule is shown in [Figure 6-12](#):

Inbound Service Rule Management

LAN Server IP Address:

Category:

Services:

#	Protocol	Port Start	Port End
1	TCP	80	80
2	TCP	443	443

Figure 6-12: Rule example: A Local Public Web Server

The parameters are:

1. LAN Server IP Address
Enter the IP address of the computer or server on your LAN which will receive the inbound traffic covered by this rule.
2. Category
From this list, select the category of application or service to be allowed.
3. Services
From this list, select the specific service or application. The list already displays many common services, but you are not limited to these choices. Use the Services menu to add any additional services or applications that do not already appear.
4. Click Apply.

Considerations for Inbound Rules

- If your external IP address is assigned dynamically by your ISP, the IP address may change periodically as the DHCP lease expires. Consider using the Dynamic DNS feature in the Advanced menu so that external users can always find your network.
- If the IP address of the local server computer is assigned by DHCP, it may change when the computer is rebooted. To avoid this, use the Reserved IP address feature in the LAN IP menu to keep the computer's IP address constant.

- Local computers must access the local server using the computer's local LAN address (192.168.0.11 in the example in [Figure 6-12](#) above). Attempts by local computers to access the server using the external WAN IP address will fail.

Outbound Rules (Service Blocking)

The DG632 allows you to block the use of certain Internet services by computers on your network. This is called service blocking or port filtering. You can define an outbound rule to block Internet access from a local computer based on:

- IP address of the local computer (source address)
- Type of service being requested (service port number)

Following is an application example of outbound rules:

Outbound Rule Example: Doom

If you want to block usage of the game Doom, you can create an outbound rule to block that application from any internal IP address.

[Outbound Service Rule Management](#)

The screenshot shows a configuration window for an outbound rule. It includes the following fields and controls:

- Host IP Address:** A text input field containing "192.168.0.11".
- Category:** A dropdown menu with "Games" selected.
- Services:** A dropdown menu with "Doom" selected.
- Buttons:** "Apply" and "Cancel" buttons.

Below the form is a table with the following data:

#	Protocol	Port Start	Port End
1	TCP,UDP	666	666

Figure 6-13: Rule example: Blocking Doom

The parameters are:

1. **Host IP Address**
Enter the IP address of the computer on your LAN from which you would like to block traffic covered by this rule.
2. **Category**
From this list, select the category of application or service to be blocked.
3. **Services**
From this list, select the specific service or application. The list already displays many common services, but you are not limited to these choices. Use the Services menu to add any additional services or applications that do not already appear.

4. Click Apply.

Configuring Advanced Settings

The DG632 ADSL Modem Router provides a variety of advanced features, such as:

- Setting up a Demilitarized Zone (DMZ) Server
- Connecting Automatically, as Required
- Disabling Port Scan and DOS Protection
- Responding to a Ping on the Internet WAN Port
- MTU Size
- The flexibility of configuring your LAN TCP/IP settings
- Using the Router as a DHCP Server
- Configuring Static Routes

These features are discussed below.

Setting Up A Default DMZ Server

The Default DMZ Server feature is helpful when using some online games and videoconferencing applications that are incompatible with NAT. The modem is programmed to recognize some of these applications and to work properly with them, but there are other applications that may not function well. In some cases, one local computer can run the application properly if that computer's IP address is entered as the Default DMZ Server.



Note: For security reasons, you should avoid using the Default DMZ Server feature. When a computer is designated as the Default DMZ Server, it loses much of the protection of the firewall, and is exposed to many exploits from the Internet. If compromised, the computer can be used to attack your network.

Incoming traffic from the Internet is normally discarded by the modem unless the traffic is a response to one of your local computers or a service that you have configured in the Ports menu. Instead of discarding this traffic, you can have it forwarded to one computer on your network. This computer is called the Default DMZ Server.

How to Configure a Default DMZ Server

To assign a computer or server to be a Default DMZ server, follow these steps:

1. Log in to the modem at its default LAN address of <http://192.168.0.1> with its default User Name of **admin**, default password of **password**, or using whatever Password and LAN address you have chosen for the modem.
2. From the Main Menu, under Advanced, click the WAN Setup link to view the page shown in [Figure 6-14](#)

The screenshot shows the WAN Setup configuration page. It features a title bar with 'WAN Setup' in blue. Below the title are several settings, each with a checkbox: 'Connect Automatically, as Required', 'Disable Port Scan and DOS Protection', 'Default DMZ Server' (which includes four input boxes for IP address), and 'Respond to Ping on Internet WAN Port'. At the bottom, there is an 'MTU Size (in bytes)' input field and two buttons labeled 'Apply' and 'Cancel'.

Figure 6-14: WAN Setup Page

3. Click Default DMZ Server.
4. Type the IP address for that server.
5. Click Apply to save your changes.

Connect Automatically, as Required

Normally, this option should be Enabled, so that an Internet connection will be made automatically, whenever Internet-bound traffic is detected. If this causes high connection costs, you can disable this setting.

If disabled, you must connect manually, using the sub-screen accessed from the "Connection Status" button on the Status screen.

If you have an "Always on" connection, this setting has no effect.

Disable Port Scan and DOS Protection

The Firewall protects your LAN against Port Scans and Denial of Service (DOS) attacks. This should be disabled only in special circumstances.

Respond to Ping on Internet WAN Port

If you want the modem to respond to a 'ping' from the Internet, select the 'Respond to Ping on Internet WAN Port' check box. This should only be used as a diagnostic tool, since it allows your modem to be discovered. Do not select this box unless you have a specific reason to do so.

MTU Size

The normal MTU (Maximum Transmit Unit) value for most Ethernet networks is 1500 Bytes, or 1492 Bytes for PPPoE connections. For some ISPs you may need to reduce the MTU. But this is rarely required, and should not be done unless you are sure it is necessary for your ISP connection.

Configuring LAN IP Settings

The LAN IP Setup menu allows configuration of LAN IP services such as DHCP and RIP. These features can be found under the Advanced heading in the Main Menu of the browser interface.

The modem is shipped preconfigured to use private IP addresses on the LAN side, and to act as a DHCP server. The modem's default LAN IP configuration is:

- LAN IP addresses—192.168.0.1
- Subnet mask—255.255.255.0

These addresses are part of the Internet Engineering Task Force (IETF)-designated private address range for use in private networks, and should be suitable in most applications. If your network has a requirement to use a different IP addressing scheme, you can make those changes in this menu.

LAN IP Setup

LAN TCP/IP Setup

IP Address . . .

IP Subnet Mask . . .

RIP Direction

RIP Version

Use Router as DHCP Server

Starting IP Address . . .

Ending IP Address . . .

Address Reservation

#	IP Address	Device Name	MAC Address

Figure 6-15: LAN IP Setup Menu

The LAN TCP/IP Setup parameters are:

- **IP Address**
This is the LAN IP address of the modem.
- **IP Subnet Mask**
This is the LAN Subnet Mask of the modem. Combined with the IP address, the IP Subnet Mask allows a device to know which other addresses are local to it, and which must be reached through a gateway or modem.
- **RIP Direction**
RIP (Router Information Protocol) allows a modem to exchange routing information with other routers. The RIP Direction selection controls how the Modem sends and receives RIP packets. Both is the default.
 - When set to Both or Out Only, the modem will broadcast its routing table periodically.
 - When set to Both or In Only, it will incorporate the RIP information that it receives.
 - When set to None, it will not send any RIP packets and will ignore any RIP packets received.

- **RIP Version**
This controls the format and the broadcasting method of the RIP packets that the modem sends. It recognizes both formats when receiving. By default, this is set for RIP-1.
 - RIP-1 is universally supported. RIP-1 is probably adequate for most networks, unless you have an unusual network setup.
 - RIP-2 carries more information. Both RIP-2B and RIP-2M send the routing data in RIP-2 format.
 - RIP-2B uses subnet broadcasting.
 - RIP-2M uses multicasting.



Note: If you change the LAN IP address of the modem while connected through the browser, you will be disconnected. You must then open a new connection to the new IP address and log in again.

DHCP

By default, the modem will function as a DHCP (Dynamic Host Configuration Protocol) server, allowing it to assign IP, DNS server, and default gateway addresses to all computers connected to the modem's LAN. The assigned default gateway address is the LAN address of the router. IP addresses will be assigned to the attached PCs from a pool of addresses specified in this menu. Each pool address is tested before it is assigned to avoid duplicate addresses on the LAN.

For most applications, the default DHCP and TCP/IP settings of the router are satisfactory. See [“IP Configuration by DHCP” on page -10](#) for an explanation of DHCP and information about how to assign IP addresses for your network.

Use Router as DHCP server

If another device on your network will be the DHCP server, or if you will manually configure the network settings of all of your computers, clear the ‘Use router as DHCP server’ check box. Otherwise, leave it selected.

Specify the pool of IP addresses to be assigned by setting the Starting IP Address and Ending IP Address. These addresses should be part of the same IP address subnet as the router’s LAN IP address. Using the default addressing scheme, you should define a range between 192.168.0.2 and 192.168.0.254, although you may want to save part of the range for devices with fixed addresses.

The router will deliver the following parameters to any LAN device that requests DHCP:

- An IP Address from the range you have defined
- Subnet Mask
- Gateway IP Address is the router's LAN IP address
- Primary DNS Server, if you entered a Primary DNS address in the Basic Settings menu; otherwise, the router's LAN IP address
- Secondary DNS Server, if you entered a Secondary DNS address in the Basic Settings menu

Address Reservation

When you specify a reserved IP address for a computer on the LAN, that computer will always receive the same IP address each time it access the router's DHCP server. Reserved IP addresses should be assigned to servers that require permanent IP settings.

To reserve an IP address:

1. Click the **Add** button.
2. In the IP Address box, type the IP address to assign to the computer or server. Choose an IP address from the router's LAN subnet, such as 192.168.0.x.
3. Type the MAC Address and Device Name of the computer or server.
Tip: If the computer is already present on your network, you can copy its MAC address from the Attached Devices menu and paste it here.
4. Click **Apply** to enter the reserved address into the table.

Note: The reserved address will not be assigned until the next time the computer contacts the router's DHCP server. Reboot the computer or access its IP configuration and force a DHCP release and renew.

To edit or delete a reserved address entry:

1. Click the button next to the reserved address you want to edit or delete.
2. Click Edit or Delete.

How to Configure LAN TCP/IP Settings

1. Log in to the router at its default LAN address of <http://192.168.0.1> with its default User Name of **admin**, default password of **password**, or using whatever User Name, Password and LAN address you have chosen for the router.

2. From the Main Menu, under Advanced, click the LAN IP Setup link to view the menu, shown in [Figure 6-15](#).
3. Enter the TCP/IP parameters.
4. Click Apply to save your changes.

Using Static Routes

Static Routes provide additional routing information to your router. Under normal circumstances, the router has adequate routing information after it has been configured for Internet access, and you do not need to configure additional static routes. You must configure static routes only for unusual cases such as multiple routers or multiple IP subnets located on your network.

Static Route Example

As an example of when a static route is needed, consider the following case:

- Your primary Internet access is through a cable modem to an ISP.
- You have an ISDN router on your home network for connecting to the company where you are employed. This router's address on your LAN is 192.168.0.100.
- Your company's network is 134.177.0.0.

When you first configured your router, two implicit static routes were created. A default route was created with your ISP as the modem, and a second static route was created to your local network for all 192.168.0.x addresses. With this configuration, if you attempt to access a device on the 134.177.0.0 network, your router will forward your request to the ISP. The ISP forwards your request to the company where you are employed, and the request will likely be denied by the company's firewall.

In this case you must define a static route, telling your router that 134.177.0.0 should be accessed through the ISDN router at 192.168.0.100. The static route would look like [Figure 6-17](#).

In this example:

- The Destination IP Address and IP Subnet Mask fields specify that this static route applies to all 134.177.x.x addresses.
- The Modem IP Address fields specifies that all traffic for these addresses should be forwarded to the ISDN router at 192.168.0.100.

- A Metric value of 1 will work since the ISDN router is on the LAN. This represents the number of routers between your network and the destination. This is a direct connection so it is set to 1.
- Private is selected only as a precautionary security measure in case RIP is activated.

How to Configure Static Routes

1. Log in to the router at its default LAN address of `http://192.168.0.1` with its default User Name of **admin**, default password of **password**, or using whatever User Name, Password and LAN address you have chosen for the router.
2. From the Main Menu of the browser interface, under Advanced, click Static Routes to view the Static Routes menu, shown in [Figure 6-16](#).

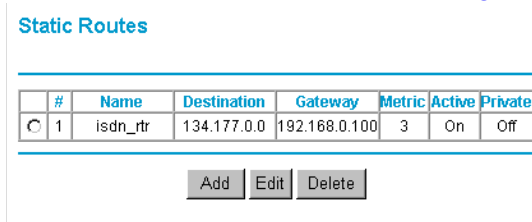


Figure 6-16: Static Routes Table

3. To add or edit a Static Route:
 - a. Click the **Edit** button to open the Edit Menu, shown in [Figure 6-17](#).

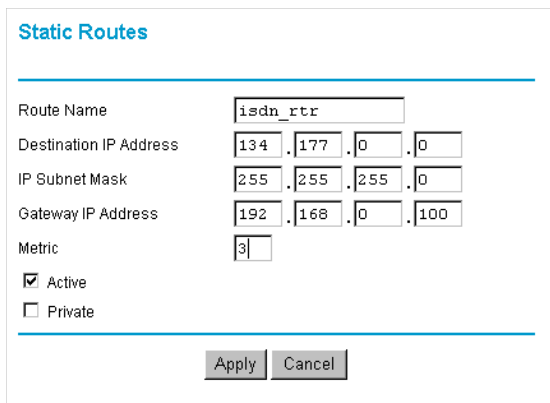


Figure 6-17: Static Route Entry and Edit Menu

- b. Type a route name for this static route in the Route Name box under the table.
This is for identification purpose only.
 - c. Type the Destination IP Address of the final destination.
 - d. Type the IP Subnet Mask for this destination.
If the destination is a single host, type 255.255.255.255.
 - e. Type the Gateway IP Address, which must be a router on the same LAN segment as the router.
 - f. Type a number between 2 and 15 as the Metric value.
This represents the number of routers between your network and the destination. Usually, a setting of 2 or 3 works, but if this is a direct connection, set it to 2.
 - g. Select **Active** to make this route effective.
 - h. Select **Private** if you want to limit access to the LAN only.
The static route will not be reported in RIP.
4. Click **Apply** to have the static route entered into the table.

Chapter 7

Troubleshooting

This chapter gives information about troubleshooting your DG632 ADSL Modem Router. After each problem description, instructions are provided to help you diagnose and solve the problem. For the common problems listed, go to the section indicated.

- Is the router on?
- Have I connected the router correctly?
Go to [“Basic Functioning” on page 7-1](#).
- I can’t access the router’s configuration with my browser.
Go to [“Troubleshooting the Web Configuration Interface” on page 7-2](#).
- I’ve configured the router but I can’t access the Internet.
Go to [“Troubleshooting the ISP Connection” on page 7-3](#).
- I can’t remember the router’s configuration password.
Go to [“Restoring the Default Configuration and Password” on page 7-8](#).
- I want to clear the configuration and start over again.
Go to [“Restoring the Default Configuration and Password” on page 7-8](#).

Basic Functioning

After you turn on power to the router, the following sequence of events should occur:

1. When power is first applied, verify that the Power LED is on (see [“The Front Panel” on page 2-6](#) for an illustration and explanation of the LEDs).
2. After approximately 10 seconds, verify that:
 - a. The LAN port LEDs are lit for any local ports that are connected.
 - b. The WAN port LED is lit.

If a port's LED is lit, a link has been established to the connected device. If a LAN port is connected to a 100 Mbps device, verify that the port's LED is green. If the port is 10 Mbps, the LED will be amber.

If any of these conditions does not occur, refer to the appropriate following section.

Power LED Not On

If the Power and other LEDs are off when your router is turned on:

- Make sure that the power cord is properly connected to your router and that the power supply adapter is properly connected to a functioning power outlet.
- Check that you are using the 7.5V DC power adapter supplied by NETGEAR for this product.

If the error persists, you have a hardware problem and should contact technical support.

LAN or WAN Port LEDs Not On

If either the LAN LEDs or WAN LED do not light when the Ethernet or USB connection is made, check the following:

- Make sure that the Ethernet or USB cable connections are secure at the router and at the hub or workstation.
- Make sure that power is turned on to the connected hub or workstation.
- Be sure you are using the correct cable:
 - When connecting the router's WAN ADSL port, use the cable that was supplied with the DG632.

Troubleshooting the Web Configuration Interface

If you are unable to access the router's Web Configuration interface from a computer on your local network, check the following:

- If you are using an Ethernet-connected computer, check the Ethernet connection between the computer and the router as described in the previous section.

- Make sure your computer's IP address is on the same subnet as the router. If you are using the recommended addressing scheme, your computer's address should be in the range of 192.168.0.2 to 192.168.0.254. Refer to [“Verifying TCP/IP Properties” on page C-6](#) or [“Verifying TCP/IP Properties for Macintosh Computers” on page C-17](#) to find your computer's IP address. Follow the instructions in [Appendix C](#) to configure your computer.

Note: If your computer's IP address is shown as 169.254.x.x:

Recent versions of Windows and MacOS will generate and assign an IP address if the computer cannot reach a DHCP server. These auto-generated addresses are in the range of 169.254.x.x. If your IP address is in this range, check the connection from the computer to the router and reboot your computer.

- If your router's IP address was changed and you do not know the current IP address, clear the router's configuration to factory defaults. This will set the router's IP address to 192.168.0.1. This procedure is explained in [“Using the Reset button” on page 7-8](#).
- Make sure your browser has Java, JavaScript, or ActiveX enabled. If you are using Internet Explorer, click Refresh to be sure the Java applet is loaded.
- Try quitting the browser and launching it again.
- Make sure you are using the correct login information. The factory default login name is **admin** and the password is **password**. Make sure that CAPS LOCK is off when entering this information.

If the router does not save changes you have made in the Web Configuration Interface, check the following:

- When entering configuration settings, be sure to click the APPLY button before moving to another menu or tab, or your changes are lost.
- Click the Refresh or Reload button in the Web browser. The changes may have occurred, but the Web browser may be caching the old configuration.

Troubleshooting the ISP Connection

If your router is unable to access the Internet, you should check the ADSL connection, then the WAN TCP/IP connection.

ADSL link

If your router is unable to access the Internet, you should first determine whether you have an ADSL link with the service provider. The state of this connection is indicated with the WAN LED.

WAN LED Green or Blinking Green

If your WAN LED is green or blinking green, then you have a good ADSL connection. You can be confident that the service provider has connected your line correctly and that your wiring is correct.

WAN LED Blinking Yellow

If your WAN LED is blinking yellow, then your modem is attempting to make an ADSL connection with the service provider. The LED should turn green within several minutes.

If the WAN LED does not turn green, disconnect all telephones on the line. If this solves the problem, reconnect the telephones one at a time, being careful to use a microfilter on each telephone. If the microfilters are connected correctly, you should be able to connect all your telephones.

If disconnecting telephones does not result in a green WAN LED, there may be a problem with your wiring. If the telephone company has tested the ADSL signal at your Network Interface Device (NID), then you may have poor quality wiring in your house.

WAN LED Off

If the WAN LED is off, disconnect all telephones on the line. If this solves the problem, reconnect the telephones one at a time, being careful to use a microfilter on each telephone. If the microfilters are connected correctly, you should be able to connect all your telephones.

If disconnecting telephones does not result in a green WAN LED the problem may be one of the following:

- Check that the telephone company has made the connection to your line and tested it.
- Verify that you are connected to the correct telephone line. If you have more than one phone line, be sure that you are connected to the line with the ADSL service. It may be necessary to use a swapper if your ADSL signal is on pins 2 and 5 or the RJ-11 jack. The DG632 modem router uses pins 3 and 4.

Obtaining a WAN IP Address

If your modem is unable to access the internet, and your WAN LED is green or blinking green, you should determine whether the modem is able to obtain a WAN IP address from the ISP. Unless you have been assigned a static IP address, your modem must request an IP address from the ISP. You can determine whether the request was successful using the browser interface.

To check the WAN IP address from the browser interface:

1. Launch your browser and select an external site such as www.netgear.com.
2. Access the Main Menu of the modem's configuration at <http://192.168.0.1>.
3. Under the Maintenance heading check that an IP address is shown for the WAN Port. If 0.0.0.0 is shown, your modem has not obtained an IP address from your ISP.

If your router is unable to obtain an IP address from the ISP, the problem may be one of the following:

- Your ISP may require a Multiplexing Method or Virtual Path Identifier/Virtual Channel Identifier parameter. Verify with your ISP the Multiplexing Method and parameter value, and update the router's ADSL Settings accordingly.
- Your ISP may require a login program. Ask your ISP whether they require PPP over Ethernet (PPPoE) or PPP over ATM (PPPoA) login.
- If you have selected a login program, you may have incorrectly set the Service Name, User Name and Password. See "[Troubleshooting PPPoE or PPPoA](#)", below.
- Your ISP may check for your computer's host name. Assign the computer Host Name of your ISP account to the modem in the browser-based Setup Wizard.
- Your ISP only allows one Ethernet MAC address to connect to Internet, and may check for your computer's MAC address. In this case:
Inform your ISP that you have bought a new network device, and ask them to use the router's MAC address.

Troubleshooting PPPoE or PPPoA

The PPPoA or PPPoA connection can be debugged as follows:

1. Access the Main Menu of the router at <http://192.168.0.1>.
2. Under the Maintenance heading, select the Router Status link.
3. Click the Connection Status button.
4. If all of the steps indicate "OK" then your PPPoE or PPPoA connection is up and working.
5. If any of the steps indicates "Failed", you can attempt to reconnect by clicking "Connect". The modem will continue to attempt to connect indefinitely.

If you cannot connect after several minutes, you may be using an incorrect Service Name, User Name or Password. There also may be a provisioning problem with your ISP.



Note: Unless you connect manually, the modem will not authenticate using PPPoE or PPPoA until data is transmitted to the network.

Troubleshooting Internet Browsing

If your modem can obtain an IP address but your computer is unable to load any Web pages from the Internet:

- Your computer may not recognize any DNS server addresses.
A DNS server is a host on the Internet that translates Internet names (such as www addresses) to numeric IP addresses. Typically your ISP will provide the addresses of one or two DNS servers for your use. If you entered a DNS address during the modem's configuration, reboot your computer and verify the DNS address as described in [“Verifying TCP/IP Properties” on page C-6](#). Alternatively, you can configure your computer manually with DNS addresses, as explained in your operating system documentation.
- Your computer may not have the modem configured as its TCP/IP modem.
If your computer obtains its information from the modem by DHCP, reboot the computer and verify the modem address as described in [“Verifying TCP/IP Properties” on page C-6](#).

Troubleshooting a TCP/IP Network Using the Ping Utility

Most TCP/IP terminal devices and routers contain a ping utility that sends an echo request packet to the designated device. The device then responds with an echo reply. Troubleshooting a TCP/IP network is made very easy by using the ping utility in your computer.

Testing the LAN Path to Your Router

You can ping the router from your computer to verify that the LAN path to your router is set up correctly.

To ping the router from a PC running Windows 95 or later:

1. From the Windows toolbar, click the Start button and select Run.

2. In the field provided, type Ping followed by the IP address of the router, as in this example:

```
ping 192.168.0.1
```

3. Click OK.

You should see a message like this one:

```
Pinging <IP address> with 32 bytes of data
```

If the path is working, you see this message:

```
Reply from < IP address >: bytes=32 time=NN ms TTL=xxx
```

If the path is not working, you see this message:

```
Request timed out
```

If the path is not functioning correctly, you could have one of the following problems:

- Wrong physical connections
 - Make sure the LAN port LED is on. If the LED is off, follow the instructions in “[LAN or WAN Port LEDs Not On](#)” on [page 7-2](#).
 - Check that the corresponding Link LEDs are on for your network interface card and for the hub ports (if any) that are connected to your workstation and router.
- Wrong network configuration
 - Verify that the Ethernet card driver software and TCP/IP software are both installed and configured on your PC or workstation.
 - Verify that the IP address for your router and your workstation are correct and that the addresses are on the same subnet.

Testing the Path from Your Computer to a Remote Device

After verifying that the LAN path works correctly, test the path from your PC to a remote device. From the Windows run menu, type:

```
PING -n 10 <IP address>
```

where *<IP address>* is the IP address of a remote device such as your ISP’s DNS server.

If the path is functioning correctly, replies as in the previous section are displayed. If you do not receive replies:

- Check that your PC has the IP address of your router listed as the default modem. If the IP configuration of your PC is assigned by DHCP, this information will not be visible in your PC's Network Control Panel. Verify that the IP address of the router is listed as the default modem as described in [“Verifying TCP/IP Properties” on page C-6](#).
- Check to see that the network address of your PC (the portion of the IP address specified by the netmask) is different from the network address of the remote device.
- Check that your cable or DSL modem is connected and functioning.
- If your ISP assigned a host name to your PC, enter that host name as the Account Name in the Basic Settings menu.
- Your ISP could be rejecting the Ethernet MAC addresses of all but one of your PCs. Many broadband ISPs restrict access by only allowing traffic from the MAC address of your broadband modem, but some ISPs additionally restrict access to the MAC address of a single PC connected to that modem. If this is the case, you must configure your router to “clone” or “spoof” the MAC address from the authorized PC.

Restoring the Default Configuration and Password

This section explains how to restore the factory default configuration settings, changing the router's administration password to **password** and the IP address to 192.168.0.1. You can erase the current configuration and restore factory defaults in two ways:

- Use the Erase function of the Web Configuration Manager (see [“Backing Up, Restoring, or Erasing Your Settings” on page 5-1](#)).
- Use the Default Reset button on the rear panel of the router. Use this method for cases when the administration password or IP address is not known.

Using the Reset button

To restore the factory default configuration settings without knowing the administration password or IP address, you must use the Default Reset button on the rear panel of the router.

1. Press and hold the Default Reset button for at least 5 seconds. The USB LED will blink.
2. Release the Default Reset button and wait for the router to reboot.

Appendix A

Technical Specifications

This appendix provides technical specifications for the DG632 ADSL Modem Router.

Network Protocol and Standards Compatibility

Data and Routing Protocols: TCP/IP, RIP-1, RIP-2, DHCP, PPP over Ethernet (PPPoE) or PPP over ATM (PPPoA), RFC 1483 Bridged or Routed Ethernet, and RFC 1577 Classical IP over ATM

Power Adapter

North America: 120V, 60 Hz, input
United Kingdom, Australia: 240V, 50 Hz, input
Europe: 230V, 50 Hz, input
Japan: 100V, 50/60 Hz, input
All regions (output): 7.5VDC @ 1.0A output, 7.5W maximum

Physical Specifications

Dimensions: 6.9" x 4.7" x 1.1"
175 mm x 119 mm x 28 mm
Weight: 0.7 lbs.
0.3 kg

Environmental Specifications

Operating temperature: 0° to 40° C (32° to 104° F)
Operating humidity: 90% maximum relative humidity, noncondensing

Electromagnetic Emissions

Meets requirements of: FCC Part 15 Class B
EN 55 022 (CISPR 22), Class B

Interface Specifications

LAN:	10BASE-T or 100BASE-Tx, RJ-45 USB 1.1
WAN:	ADSL, RJ-11, pins 2 and 3 T1.413, G.DMT, G.Lite ITU Annex A or B

Appendix B

Network and Routing Basics

This chapter provides an overview of IP networks and routing.

Related Publications

As you read this document, you may be directed to various RFC documents for further information. An RFC is a Request For Comment (RFC) published by the Internet Engineering Task Force (IETF), an open organization that defines the architecture and operation of the Internet. The RFC documents outline and define the standard protocols and procedures for the Internet. The documents are listed on the World Wide Web at www.ietf.org and are mirrored and indexed at many other sites worldwide.

Basic Router Concepts

Large amounts of bandwidth can be provided easily and relatively inexpensively in a local area network (LAN). However, providing high bandwidth between a local network and the Internet can be very expensive. Because of this expense, Internet access is usually provided by a slower-speed wide-area network (WAN) link such as a cable or DSL modem. In order to make the best use of the slower WAN link, a mechanism must be in place for selecting and transmitting only the data traffic meant for the Internet. The function of selecting and forwarding this data is performed by a router.

What is a Router?

A router is a device that forwards traffic between networks based on network layer information in the data and on routing tables maintained by the router. In these routing tables, a router builds up a logical picture of the overall network by gathering and exchanging information with other routers in the network. Using this information, the router chooses the best path for forwarding network traffic.

Routers vary in performance and scale, number of routing protocols supported, and types of physical WAN connection they support. The DG632 ADSL Modem Router is a small office router that routes the IP protocol over a single-user broadband connection.

Routing Information Protocol

One of the protocols used by a router to build and maintain a picture of the network is the Routing Information Protocol (RIP). Using RIP, routers periodically update one another and check for changes to add to the routing table.

The DG632 modem router supports both the older RIP-1 and the newer RIP-2 protocols. Among other improvements, RIP-2 supports subnet and multicast protocols. RIP is not required for most home applications.

IP Addresses and the Internet

Because TCP/IP networks are interconnected across the world, every machine on the Internet must have a unique address to make sure that transmitted data reaches the correct destination. Blocks of addresses are assigned to organizations by the Internet Assigned Numbers Authority (IANA). Individual users and small organizations may obtain their addresses either from the IANA or from an Internet service provider (ISP). You can contact IANA at www.iana.org.

The Internet Protocol (IP) uses a 32-bit address structure. The address is usually written in dot notation (also called dotted-decimal notation), in which each group of eight bits is written in decimal form, separated by decimal points.

For example, the following binary address:

```
11000011 00100010 00001100 00000111
```

is normally written as:

```
195.34.12.7
```

The latter version is easier to remember and easier to enter into your computer.

In addition, the 32 bits of the address are subdivided into two parts. The first part of the address identifies the network, and the second part identifies the host node or station on the network. The dividing point may vary depending on the address range and the application.

There are five standard classes of IP addresses. These address classes have different ways of determining the network and host sections of the address, allowing for different numbers of hosts on a network. Each address type begins with a unique bit pattern, which is used by the TCP/IP software to identify the address class. After the address class has been determined, the software can correctly identify the host section of the address. The follow figure shows the three main address classes, including network and host sections of the address for each address type.

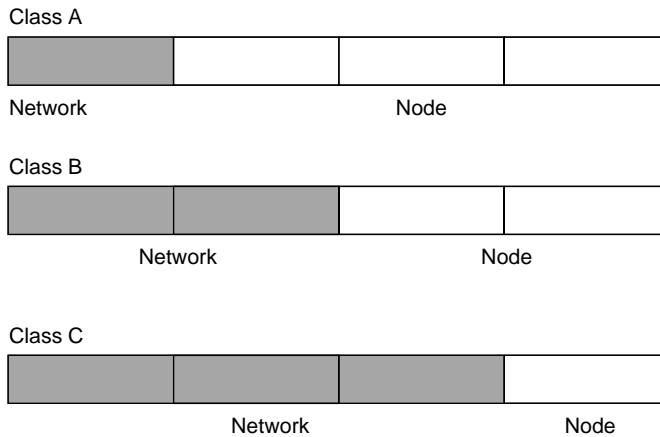


Figure 7-1: Three Main Address Classes

The five address classes are:

- **Class A**
Class A addresses can have up to 16,777,214 hosts on a single network. They use an eight-bit network number and a 24-bit node number. Class A addresses are in this range:
`1.x.x.x to 126.x.x.x.`
- **Class B**
Class B addresses can have up to 65,354 hosts on a network. A Class B address uses a 16-bit network number and a 16-bit node number. Class B addresses are in this range:
`128.1.x.x to 191.254.x.x.`

- Class C
Class C addresses can have 254 hosts on a network. Class C addresses use 24 bits for the network address and eight bits for the node. They are in this range:
192.0.1.x to 223.255.254.x.
- Class D
Class D addresses are used for multicasts (messages sent to many hosts). Class D addresses are in this range:
224.0.0.0 to 239.255.255.255.
- Class E
Class E addresses are for experimental use.

This addressing structure allows IP addresses to uniquely identify each physical network and each node on each physical network.

For each unique value of the network portion of the address, the base address of the range (host address of all zeros) is known as the network address and is not usually assigned to a host. Also, the top address of the range (host address of all ones) is not assigned, but is used as the broadcast address for simultaneously sending a packet to all hosts with the same network address.

Netmask

In each of the address classes previously described, the size of the two parts (network address and host address) is implied by the class. This partitioning scheme can also be expressed by a netmask associated with the IP address. A netmask is a 32-bit quantity that, when logically combined (using an AND operator) with an IP address, yields the network address. For instance, the netmasks for Class A, B, and C addresses are 255.0.0.0, 255.255.0.0, and 255.255.255.0, respectively.

For example, the address 192.168.170.237 is a Class C IP address whose network portion is the upper 24 bits. When combined (using an AND operator) with the Class C netmask, as shown here, only the network portion of the address remains:

```
11000000 10101000 10101010 11101101 (192.168.170.237)
```

combined with:

```
11111111 11111111 11111111 00000000 (255.255.255.0)
```

Equals:

```
11000000 10101000 10101010 00000000 (192.168.170.0)
```

As a shorter alternative to dotted-decimal notation, the netmask may also be expressed in terms of the number of ones from the left. This number is appended to the IP address, following a backward slash (/), as “/n.” In the example, the address could be written as 192.168.170.237/24, indicating that the netmask is 24 ones followed by 8 zeros.

Subnet Addressing

By looking at the addressing structures, you can see that even with a Class C address, there are a large number of hosts per network. Such a structure is an inefficient use of addresses if each end of a routed link requires a different network number. It is unlikely that the smaller office LANs would have that many devices. You can resolve this problem by using a technique known as subnet addressing.

Subnet addressing allows us to split one IP network address into smaller multiple physical networks known as subnetworks. Some of the node numbers are used as a subnet number instead. A Class B address gives us 16 bits of node numbers translating to 64,000 nodes. Most organizations do not use 64,000 nodes, so there are free bits that can be reassigned. Subnet addressing makes use of those bits that are free, as shown below.



Figure 7-2: Example of Subnetting a Class B Address

A Class B address can be effectively translated into multiple Class C addresses. For example, the IP address of 172.16.0.0 is assigned, but node addresses are limited to 255 maximum, allowing eight extra bits to use as a subnet address. The IP address of 172.16.97.235 would be interpreted as IP network address 172.16, subnet number 97, and node number 235. In addition to extending the number of addresses available, subnet addressing provides other benefits. Subnet addressing allows a network manager to construct an address scheme for the network by using different subnets for other geographical locations in the network or for other departments in the organization.

Although the preceding example uses the entire third octet for a subnet address, note that you are not restricted to octet boundaries in subnetting. To create more network numbers, you need only shift some bits from the host address to the network address. For instance, to partition a Class C network number (192.68.135.0) into two, you shift one bit from the host address to the network address. The new netmask (or subnet mask) is 255.255.255.128. The first subnet has network number 192.68.135.0 with hosts 192.68.135.1 to 192.68.135.126, and the second subnet has network number 192.68.135.128 with hosts 192.68.135.129 to 192.68.135.254.



Note: The number 192.68.135.127 is not assigned because it is the broadcast address of the first subnet. The number 192.68.135.128 is not assigned because it is the network address of the second subnet.

The following table lists the additional subnet mask bits in dotted-decimal notation. To use the table, write down the original class netmask and replace the 0 value octets with the dotted-decimal value of the additional subnet bits. For example, to partition your Class C network with subnet mask 255.255.255.0 into 16 subnets (4 bits), the new subnet mask becomes 255.255.255.240.

Table 7-1. Netmask Notation Translation Table for One Octet

Number of Bits	Dotted-Decimal Value
1	128
2	192
3	224
4	240
5	248
6	252
7	254
8	255

The following table displays several common netmask values in both the dotted-decimal and the masklength formats.

Table 7-2. Netmask Formats

Dotted-Decimal	Masklength
255.0.0.0	/8
255.255.0.0	/16

Table 7-2. Netmask Formats

255.255.255.0	/24
255.255.255.128	/25
255.255.255.192	/26
255.255.255.224	/27
255.255.255.240	/28
255.255.255.248	/29
255.255.255.252	/30
255.255.255.254	/31
255.255.255.255	/32

NETGEAR strongly recommends that you configure all hosts on a LAN segment to use the same netmask for the following reasons:

- So that hosts recognize local IP broadcast packets

When a device broadcasts to its segment neighbors, it uses a destination address of the local network address with all ones for the host address. In order for this scheme to work, all devices on the segment must agree on which bits comprise the host address.

- So that a local router or bridge recognizes which addresses are local and which are remote

Private IP Addresses

If your local network is isolated from the Internet (for example, when using NAT), you can assign any IP addresses to the hosts without problems. However, the IANA has reserved the following three blocks of IP addresses specifically for private networks:

10.0.0.0 - 10.255.255.255
172.16.0.0 - 172.31.255.255
192.168.0.0 - 192.168.255.255

NETGEAR recommends that you choose your private network number from this range. The DHCP server of the DG632 modem router is preconfigured to automatically assign private addresses.

Regardless of your particular situation, do not create an arbitrary IP address; always follow the guidelines explained here. For more information about address assignment, refer to RFC 1597, *Address Allocation for Private Internets*, and RFC 1466, *Guidelines for Management of IP Address Space*. The Internet Engineering Task Force (IETF) publishes RFCs on its Web site at www.ietf.org.

Single IP Address Operation Using NAT

In the past, if multiple PCs on a LAN needed to access the Internet simultaneously, you had to obtain a range of IP addresses from the ISP. This type of Internet account is more costly than a single-address account typically used by a single user with a modem, rather than a router. The DG632 modem router employs an address-sharing method called Network Address Translation (NAT). This method allows several networked PCs to share an Internet account using only a single IP address, which may be statically or dynamically assigned by your ISP.

The router accomplishes this address sharing by translating the internal LAN IP addresses to a single address that is globally unique on the Internet. The internal LAN IP addresses can be either private addresses or registered addresses. For more information about IP address translation, refer to RFC 1631, *The IP Network Address Translator (NAT)*.

The following figure illustrates a single IP address operation.

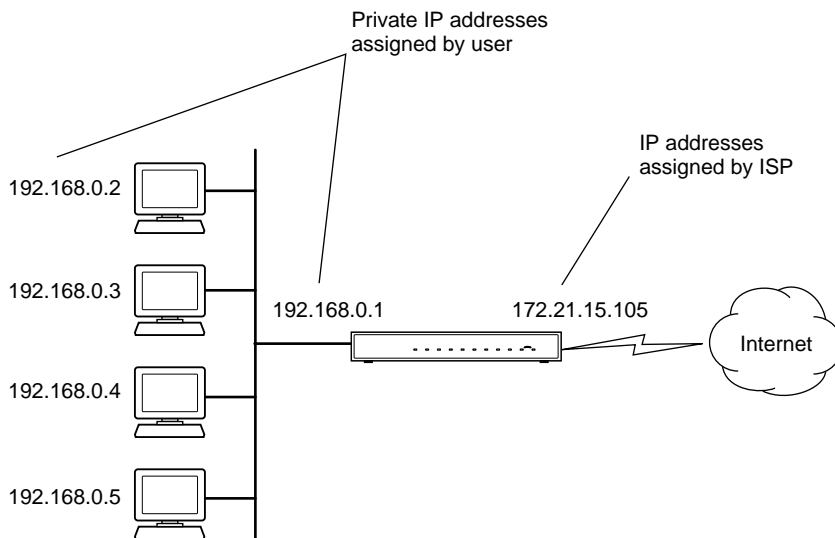


Figure 7-3: Single IP Address Operation Using NAT

This scheme offers the additional benefit of firewall-like protection because the internal LAN addresses are not available to the Internet through the translated connection. All incoming inquiries are filtered out by the router. This filtering can prevent intruders from probing your system. However, using port forwarding, you can allow one PC (for example, a Web server) on your local network to be accessible to outside users.

MAC Addresses and Address Resolution Protocol

An IP address alone cannot be used to deliver data from one LAN device to another. To send data between LAN devices, you must convert the IP address of the destination device to its media access control (MAC) address. Each device on an Ethernet network has a unique MAC address, which is a 48-bit number assigned to each device by the manufacturer. The technique that associates the IP address with a MAC address is known as address resolution. Internet Protocol uses the Address Resolution Protocol (ARP) to resolve MAC addresses.

If a device sends data to another station on the network and the destination MAC address is not yet recorded, ARP is used. An ARP request is broadcast onto the network. All stations on the network receive and read the request. The destination IP address for the chosen station is included as part of the message so that only the station with this IP address responds to the ARP request. All other stations discard the request.

Related Documents

The station with the correct IP address responds with its own MAC address directly to the sending device. The receiving station provides the transmitting station with the required destination MAC address. The IP address data and MAC address data for each station are held in an ARP table. The next time data is sent, the address can be obtained from the address information in the table.

For more information about address assignment, refer to the IETF documents RFC 1597, *Address Allocation for Private Internets*, and RFC 1466, *Guidelines for Management of IP Address Space*.

For more information about IP address translation, refer to RFC 1631, *The IP Network Address Translator (NAT)*.

Domain Name Server

Many of the resources on the Internet can be addressed by simple descriptive names such as *www.NETGEAR.com*. This addressing is very helpful at the application level, but the descriptive name must be translated to an IP address in order for a user to actually contact the resource. Just as a telephone directory maps names to phone numbers, or as an ARP table maps IP addresses to MAC addresses, a domain name system (DNS) server maps descriptive names of network resources to IP addresses.

When a PC accesses a resource by its descriptive name, it first contacts a DNS server to obtain the IP address of the resource. The PC sends the desired message using the IP address. Many large organizations, such as ISPs, maintain their own DNS servers and allow their customers to use the servers to look up addresses.

IP Configuration by DHCP

When an IP-based local area network is installed, each PC must be configured with an IP address. If the PCs need to access the Internet, they should also be configured with a gateway address and one or more DNS server addresses. As an alternative to manual configuration, there is a method by which each PC on the network can automatically obtain this configuration information. A device on the network may act as a Dynamic Host Configuration Protocol (DHCP) server. The DHCP server stores a list or pool of IP addresses, along with other information (such as gateway and DNS addresses) that it may assign to the other devices on the network. The DG632 modem router has the capacity to act as a DHCP server.

The DG632 modem router also functions as a DHCP client when connecting to the ISP. The router can automatically obtain an IP address, subnet mask, DNS server addresses, and a gateway address if the ISP provides this information by DHCP.

Internet Security and Firewalls

When your LAN connects to the Internet through a router, an opportunity is created for outsiders to access or disrupt your network. A NAT router provides some protection because by the very nature of the Network Address Translation (NAT) process, the network behind the NAT router is shielded from access by outsiders on the Internet. However, there are methods by which a determined hacker can possibly obtain information about your network or at the least can disrupt your Internet access. A greater degree of protection is provided by a firewall router.

What is a Firewall?

A firewall is a device that protects one network from another, while allowing communication between the two. A firewall incorporates the functions of the NAT router, while adding features for dealing with a hacker intrusion or attack. Several known types of intrusion or attack can be recognized when they occur. When an incident is detected, the firewall can log details of the attempt, and can optionally send email to an administrator notifying them of the incident. Using information from the log, the administrator can take action with the ISP of the hacker. In some types of intrusions, the firewall can fend off the hacker by discarding all further packets from the hacker's IP address for a period of time.

Stateful Packet Inspection

Unlike simple Internet sharing routers, a firewall uses a process called stateful packet inspection to ensure secure firewall filtering to protect your network from attacks and intrusions. Since user-level applications such as FTP and Web browsers can create complex patterns of network traffic, it is necessary for the firewall to analyze groups of network connection states. Using Stateful Packet Inspection, an incoming packet is intercepted at the network layer and then analyzed for state-related information associated with all network connections. A central cache within the firewall keeps track of the state information associated with all network connections. All traffic passing through the firewall is analyzed against the state of these connections in order to determine whether or not it will be allowed to pass through or rejected.

Denial of Service Attack

A hacker may be able to prevent your network from operating or communicating by launching a Denial of Service (DoS) attack. The method used for such an attack can be as simple as merely flooding your site with more requests than it can handle. A more sophisticated attack may attempt to exploit some weakness in the operating system used by your router or gateway. Some operating systems can be disrupted by simply sending a packet with incorrect length information.

Ethernet Cabling

Although Ethernet networks originally used thick or thin coaxial cable, most installations currently use unshielded twisted pair (UTP) cabling. The UTP cable contains eight conductors, arranged in four twisted pairs, and terminated with an RJ45 type connector. A normal straight-through UTP Ethernet cable follows the EIA568B standard wiring as described below in [Table B-1](#)

Table B-1. UTP Ethernet cable wiring, straight-through

Pin	Wire color	Signal
1	Orange/White	Transmit (Tx) +
2	Orange	Transmit (Tx) -
3	Green/White	Receive (Rx) +
4	Blue	
5	Blue/White	
6	Green	Receive (Rx) -
7	Brown/White	
8	Brown	

Category 5 Cable Quality

Category 5 distributed cable that meets ANSI/EIA/TIA-568-A building wiring standards can be a maximum of 328 feet (ft.) or 100 meters (m) in length, divided as follows:

20 ft. (6 m) between the hub and the patch panel (if used)

295 ft. (90 m) from the wiring closet to the wall outlet

10 ft. (3 m) from the wall outlet to the desktop device

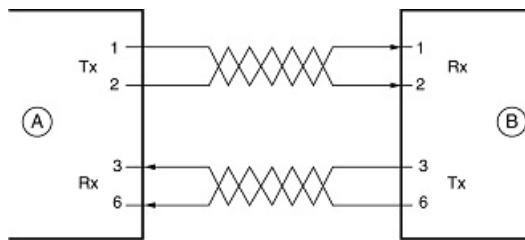
The patch panel and other connecting hardware must meet the requirements for 100 Mbps operation (Category 5). Only 0.5 inch (1.5 cm) of untwist in the wire pair is allowed at any termination point.

A twisted pair Ethernet network operating at 10 Mbits/second (10BASE-T) will often tolerate low quality cables, but at 100 Mbits/second (10BASE-Tx) the cable must be rated as Category 5, or Cat 5, by the Electronic Industry Association (EIA). This rating will be printed on the cable jacket. A Category 5 cable will meet specified requirements regarding loss and crosstalk. In addition, there are restrictions on maximum cable length for both 10 and 100 Mbits/second networks.

Inside Twisted Pair Cables

For two devices to communicate, the transmitter of each device must be connected to the receiver of the other device. The crossover function is usually implemented internally as part of the circuitry in the device. Computers and workstation adapter cards are usually media-dependent interface ports, called MDI or uplink ports. Most repeaters and switch ports are configured as media-dependent interfaces with built-in crossover ports, called MDI-X or normal ports. Auto Uplink technology automatically senses which connection, MDI or MDI-X, is needed and makes the right connection.

Figure B-1 illustrates straight-through twisted pair cable.



Key:

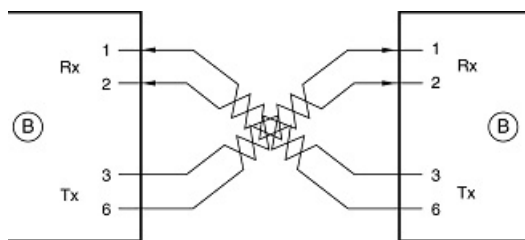
A = UPLINK OR MDI PORT (as on a PC)

B = Normal or MDI-X port (as on a hub or switch)

1, 2, 3, 6 = Pin numbers

Figure B-1: Straight-Through Twisted-Pair Cable

Figure B-2 illustrates crossover twisted pair cable.



Key:

B = Normal or MDI-X port (as on a hub or switch)

1, 2, 3, 6 = Pin numbers

Figure B-2: Crossover Twisted-Pair Cable

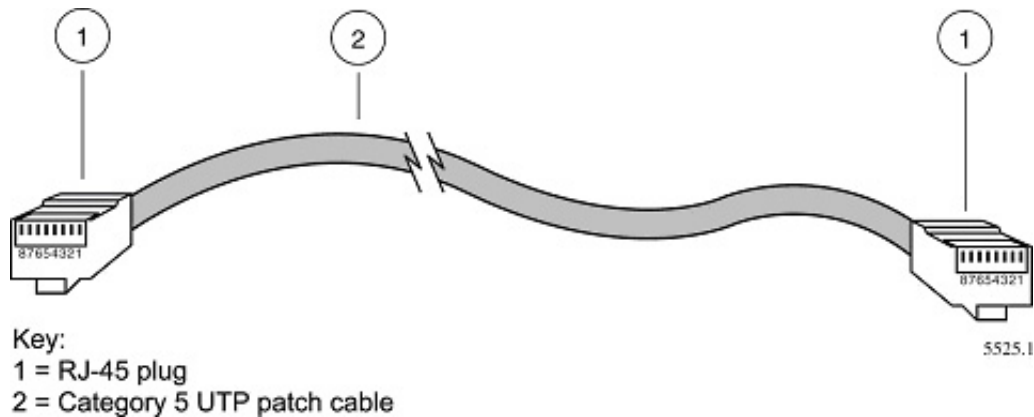


Figure B-3: Category 5 UTP Cable with Male RJ-45 Plug at Each End

Note: Flat “silver satin” telephone cable may have the same RJ-45 plug. However, using telephone cable results in excessive collisions, causing the attached port to be partitioned or disconnected from the network.

Uplink Switches, Crossover Cables, and MDI/MDIX Switching

In the wiring table above, the concept of transmit and receive are from the perspective of the PC, which is wired as Media Dependant Interface (MDI). In this wiring, the PC transmits on pins 1 and 2. At the hub, the perspective is reversed, and the hub receives on pins 1 and 2. This wiring is referred to as Media Dependant Interface - Crossover (MDI-X).

When connecting a PC to a PC, or a hub port to another hub port, the transmit pair must be exchanged with the receive pair. This exchange is done by one of two mechanisms. Most hubs provide an Uplink switch which will exchange the pairs on one port, allowing that port to be connected to another hub using a normal Ethernet cable. The second method is to use a crossover cable, which is a special cable in which the transmit and receive pairs are exchanged at one of the two cable connectors. Crossover cables are often unmarked as such, and must be identified by comparing the two connectors. Since the cable connectors are clear plastic, it is easy to place them side by side and view the order of the wire colors on each. On a straight-through cable, the color order will be the same on both connectors. On a crossover cable, the orange and blue pairs will be exchanged from one connector to the other.

The DG632 modem router incorporates Auto Uplink™ technology (also called MDI/MDIX). Each LOCAL Ethernet port will automatically sense whether the Ethernet cable plugged into the port should have a normal connection (e.g. connecting to a PC) or an uplink connection (e.g. connecting to a router, switch, or hub). That port will then configure itself to the correct configuration. This feature also eliminates the need to worry about crossover cables, as Auto Uplink™ will accommodate either type of cable to make the right connection.

Appendix C

Preparing Your Network

This appendix describes how to prepare your network to connect to the Internet through the DG632 ADSL Modem Router and how to verify the readiness of broadband Internet service from an Internet service provider (ISP).



Note: If an ISP technician configured your computer during the installation of a broadband modem, or if you configured it using instructions provided by your ISP, you may need to copy the current configuration information for use in the configuration of your router. Write down this information before reconfiguring your computers. Refer to “[Obtaining ISP Configuration Information for Windows Computers](#)” on [page C-19](#) or “[Obtaining ISP Configuration Information for Macintosh Computers](#)” on [page C-20](#) for further information.

Preparing Your Computers for TCP/IP Networking

Computers access the Internet using a protocol called TCP/IP (Transmission Control Protocol/Internet Protocol). Each computer on your network must have TCP/IP installed and selected as its networking protocol. If a Network Interface Card (NIC) is already installed in your PC, then TCP/IP is probably already installed as well.

Most operating systems include the software components you need for networking with TCP/IP:

- Windows® 95 or later includes the software components for establishing a TCP/IP network.
- Windows 3.1 does not include a TCP/IP component. You need to purchase a third-party TCP/IP application package such as NetManage Chameleon.
- Macintosh Operating System 7 or later includes the software components for establishing a TCP/IP network.
- All versions of UNIX or Linux include TCP/IP components. Follow the instructions provided with your operating system or networking software to install TCP/IP on your computer.

In your IP network, each PC and the router must be assigned a unique IP addresses. Each PC must also have certain other IP configuration information such as a subnet mask (netmask), a domain name server (DNS) address, and a default gateway address. In most cases, you should install TCP/IP so that the PC obtains its specific network configuration information automatically from a DHCP server during bootup. For a detailed explanation of the meaning and purpose of these configuration items, refer to “[Appendix B, “Network and Routing Basics.”](#)”

The DG632 modem router is shipped preconfigured as a DHCP server. The router assigns the following TCP/IP configuration information automatically when the PCs are rebooted:

- PC or workstation IP addresses—192.168.0.2 through 192.168.0.254
- Subnet mask—255.255.255.0
- Gateway address (the router)—192.168.0.1

These addresses are part of the IETF-designated private address range for use in private networks.

Configuring Windows 95, 98, and Me for TCP/IP Networking

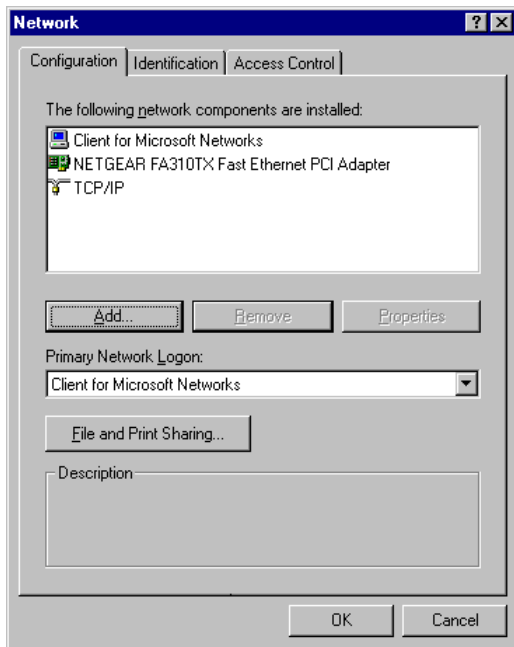
As part of the PC preparation process, you need to manually install and configure TCP/IP on each networked PC. Before starting, locate your Windows CD; you may need to insert it during the TCP/IP installation process.

Installing or Verifying Windows Networking Components

To install or verify the necessary components for IP networking:

1. On the Windows taskbar, click the Start button, point to Settings, and then click Control Panel.
2. Double-click the Network icon.

The Network window opens, which displays a list of installed components:



You must have an Ethernet adapter, the TCP/IP protocol, and Client for Microsoft Networks.



Note: It is not necessary to remove any other network components shown in the Network window in order to install the adapter, TCP/IP, or Client for Microsoft Networks.

If you need to install a new adapter, follow these steps:

- a. Click the Add button.
- b. Select Adapter, and then click Add.
- c. Select the manufacturer and model of your Ethernet adapter, and then click OK.

If you need TCP/IP:

- a. Click the Add button.
- b. Select Protocol, and then click Add.
- c. Select Microsoft.
- d. Select TCP/IP, and then click OK.

If you need Client for Microsoft Networks:

- a. Click the Add button.
 - b. Select Client, and then click Add.
 - c. Select Microsoft.
 - d. Select Client for Microsoft Networks, and then click OK.
3. Restart your PC for the changes to take effect.

Enabling DHCP to Automatically Configure TCP/IP Settings in Windows 95B, 98, and Me

After the TCP/IP protocol components are installed, each PC must be assigned specific information about itself and resources that are available on its network. The simplest way to configure this information is to allow the PC to obtain the information from a DHCP server in the network.

You will find there are many similarities in the procedures for different Windows systems when using DHCP to configure TCP/IP.

The following steps will walk you through the configuration process for each of these versions of Windows.

1

Locate your **Network Neighborhood** icon.

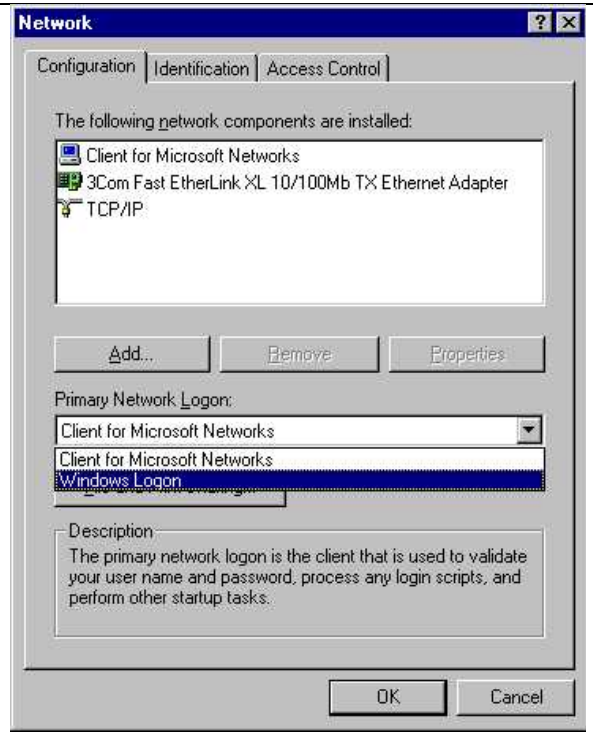
- If the Network Neighborhood icon is on the Windows desktop, position your mouse pointer over it and right-click your mouse button.
- If the icon is not on the desktop,
 - Click **Start** on the task bar located at the bottom left of the window.
 - Choose **Settings**, and then **Control Panel**.
 - Locate the **Network Neighborhood** icon and click on it. This will open the Network panel as shown below.

2

Verify the following settings as shown:

- Client for Microsoft Network exists
- Ethernet adapter is present
- TCP/IP is present
- **Primary Network Logon** is set to Windows logon

Click on the **Properties** button. The following TCP/IP Properties window will display.

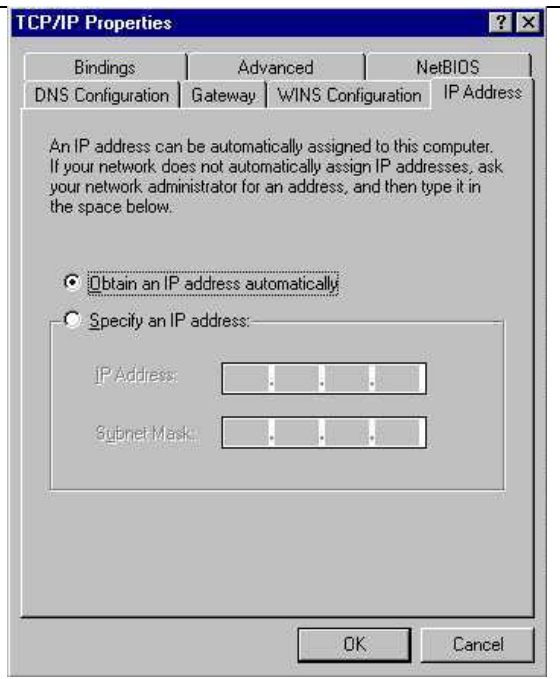


3

- By default, the **IP Address** tab is open on this window.
- Verify the following:
 - **Obtain an IP address automatically** is selected. If not selected, click in the radio button to the left of it to select it. This setting is required to enable the DHCP server to automatically assign an IP address.
 - Click **OK** to continue.

Restart the PC.

Repeat these steps for each PC with this version of Windows on your network.



Selecting the Windows' Internet Access Method

1. On the Windows taskbar, click the Start button, point to Settings, and then click Control Panel.
2. Double-click the Internet Options icon.
3. Select "I want to set up my Internet connection manually" or "I want to connect through a Local Area Network" and click Next.
4. Select "I want to connect through a Local Area Network" and click Next.
5. Uncheck all boxes in the LAN Internet Configuration screen and click Next.
6. Proceed to the end of the Wizard.

Verifying TCP/IP Properties

After your PC is configured and has rebooted, you can check the TCP/IP configuration using the utility *wiipcfg.exe*:

1. On the Windows taskbar, click the Start button, and then click Run.

2. Type `winiipcfg`, and then click OK.

The IP Configuration window opens, which lists (among other things), your IP address, subnet mask, and default gateway.

3. From the drop-down box, select your Ethernet adapter.

The window is updated to show your settings, which should match the values below if you are using the default TCP/IP settings that NETGEAR recommends for connecting through a router or gateway:

- The IP address is between 192.168.0.2 and 192.168.0.254
- The subnet mask is 255.255.255.0
- The default gateway is 192.168.0.1

Configuring Windows NT4, 2000 or XP for IP Networking

As part of the PC preparation process, you may need to install and configure TCP/IP on each networked PC. Before starting, locate your Windows CD; you may need to insert it during the TCP/IP installation process.

Installing or Verifying Windows Networking Components

To install or verify the necessary components for IP networking:

1. On the Windows taskbar, click the Start button, point to Settings, and then click Control Panel.
2. Double-click the Network and Dialup Connections icon.
3. If an Ethernet adapter is present in your PC, you should see an entry for Local Area Connection. Double-click that entry.
4. Select Properties.
5. Verify that 'Client for Microsoft Networks' and 'Internet Protocol (TCP/IP)' are present. If not, select Install and add them.
6. Select 'Internet Protocol (TCP/IP)', click Properties, and verify that "Obtain an IP address automatically is selected.
7. Click OK and close all Network and Dialup Connections windows.
8. Then, restart your PC.

DHCP Configuration of TCP/IP in Windows XP, 2000, or NT4

You will find there are many similarities in the procedures for different Windows systems when using DHCP to configure TCP/IP.

The following steps will walk you through the configuration process for each of these versions of Windows.

DHCP Configuration of TCP/IP in Windows XP

1

Locate your **Network Neighborhood** icon.

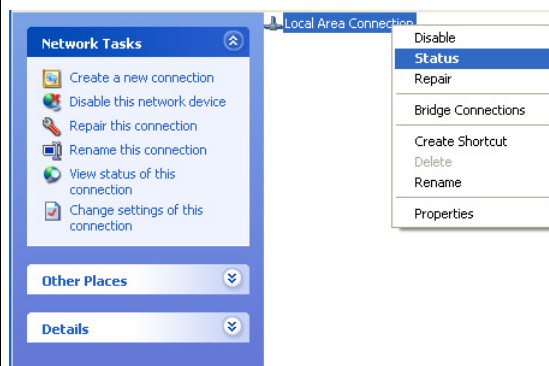
- Select **Control Panel** from the Windows XP new Start Menu.
- Select the **Network Connections** icon on the Control Panel. This will take you to the next step.

2

- Now the Network Connection window displays.

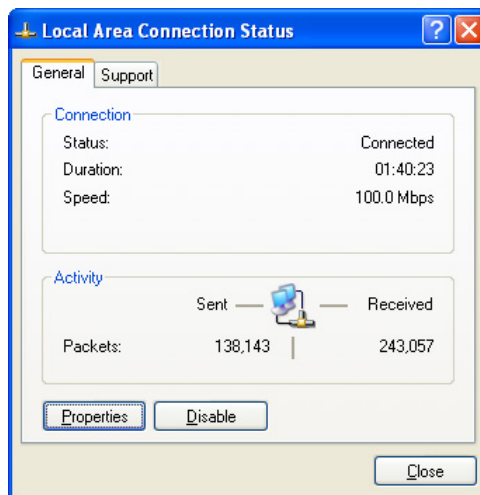
The Connections List that shows all the network connections set up on the PC, located to the right of the window.

- Right-click on the **Connection** you will use and choose **Status**.



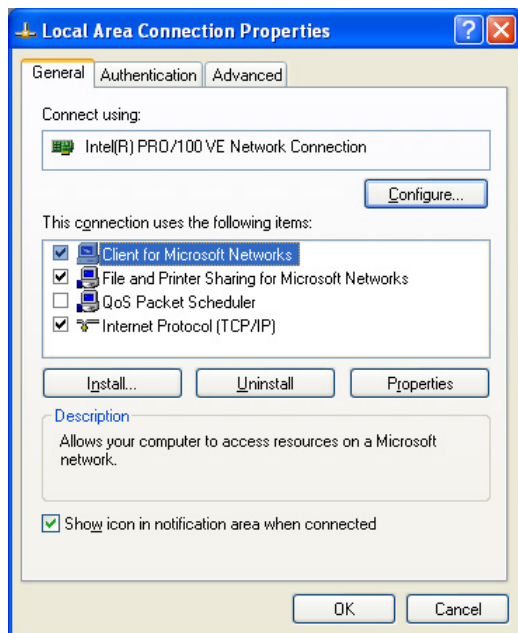
3

- Now you should be at the Local Area Network Connection Status window. This box displays the connection status, duration, speed, and activity statistics.
- Administrator logon access rights are needed to use this window.
- Click the **Properties** button to view details about the connection.



4

- The TCP/IP details are presented on the Support tab page.
- Select **Internet Protocol**, and click **Properties** to view the configuration information.

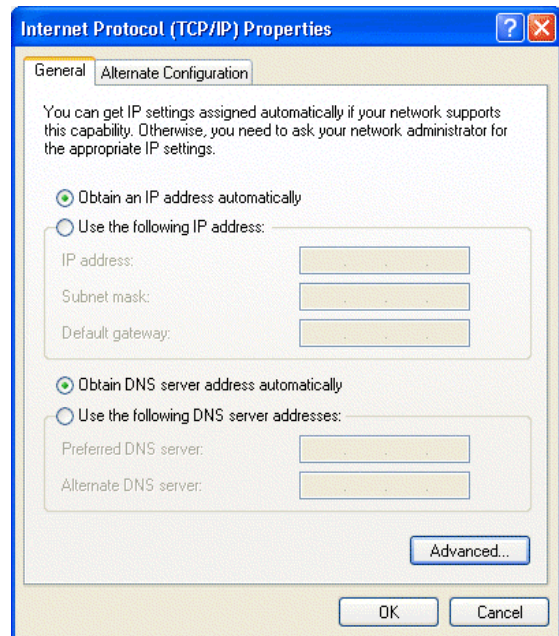


5

- Verify that the **Obtain an IP address automatically** radio button is selected.
- Verify that **Obtain DNS server address automatically** radio button is selected.
- Click the **OK** button.

This completes the DHCP configuration of TCP/IP in Windows XP.

Repeat these steps for each PC with this version of Windows on your network.



DHCP Configuration of TCP/IP in Windows 2000

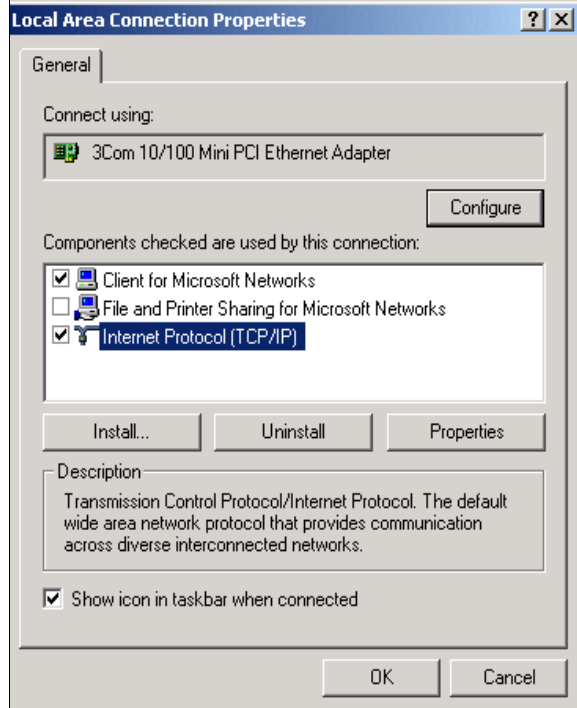
Once again, after you have installed the network card, TCP/IP for Windows 2000 is configured. TCP/IP should be added by default and set to DHCP without your having to configure it. However, if there are problems, follow these steps to configure TCP/IP with DHCP for Windows 2000.

1

- Click on the **My Network Places** icon on the Windows desktop. This will bring up a window called Network and Dial-up Connections.
- Right click on **Local Area Connection** and select **Properties**.

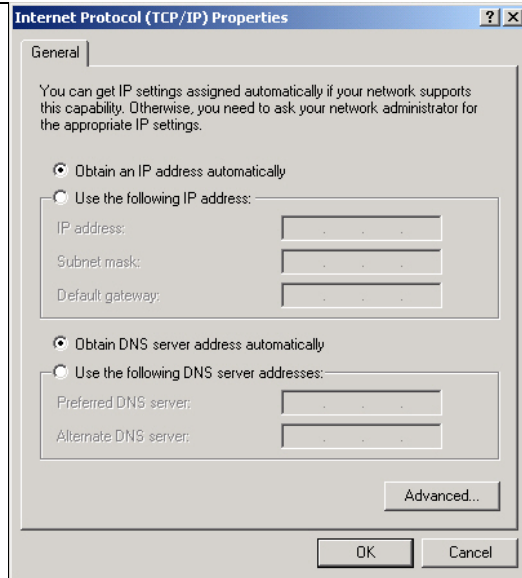
2

- The **Local Area Connection Properties** dialog box appears.
- Verify that you have the correct Ethernet card selected in the **Connect using:** box.
- Verify that at least the following two items are displayed and selected in the box of “Components checked are used by this connection:”
 - Client for Microsoft Networks and
 - Internet Protocol (TCP/IP)
- Click **OK**.



3

- With Internet Protocol (TCP/IP) selected, click on **Properties** to open the Internet Protocol (TCP/IP) Properties dialogue box.
- Verify that
 - **Obtain an IP address automatically** is selected.
 - **Obtain DNS server address automatically** is selected.
- Click **OK** to return to Local Area Connection Properties.

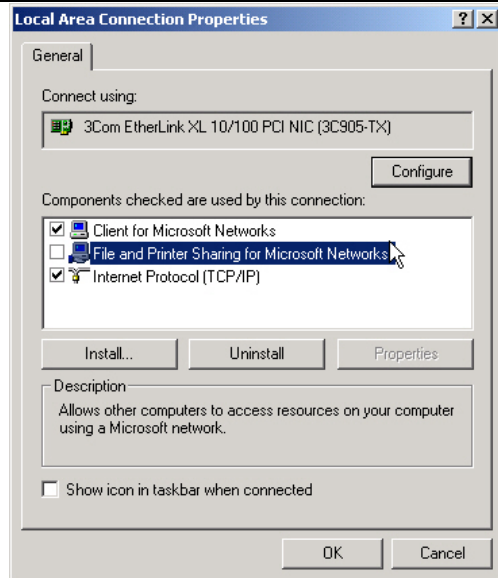


4

- Click **OK** again to complete the configuration process for Windows 2000.

Restart the PC.

Repeat these steps for each PC with this version of Windows on your network.



DHCP Configuration of TCP/IP in Windows NT4

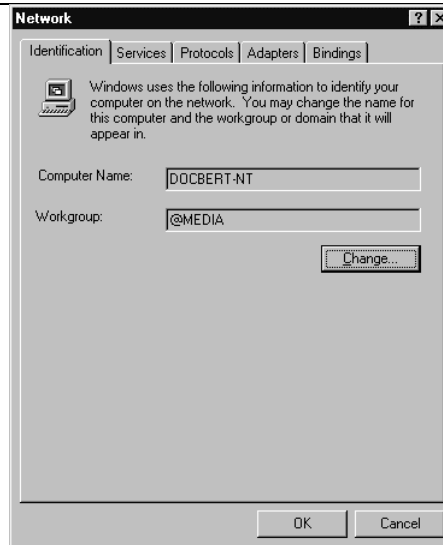
Once you have installed the network card, you need to configure the TCP/IP environment for Windows NT 4.0. Follow this procedure to configure TCP/IP with DHCP in Windows NT 4.0.

1

- Choose **Settings** from the Start Menu, and then select **Control Panel**.
This will display Control Panel window.

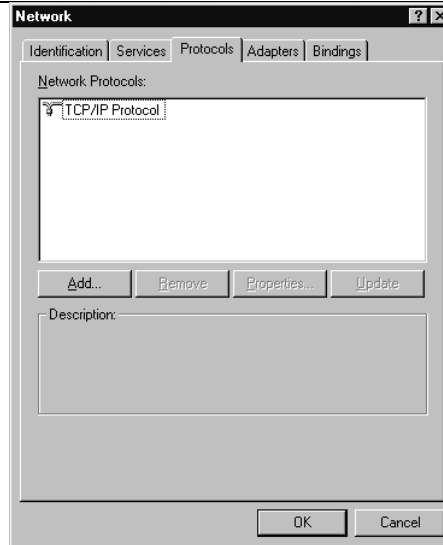
2

- Double-click the **Network** icon in the Control Panel window.
The Network panel will display.
- Select the **Protocols** tab to continue.



3

- Highlight the **TCP/IP Protocol** in the **Network Protocols** box, and click on the **Properties** button.

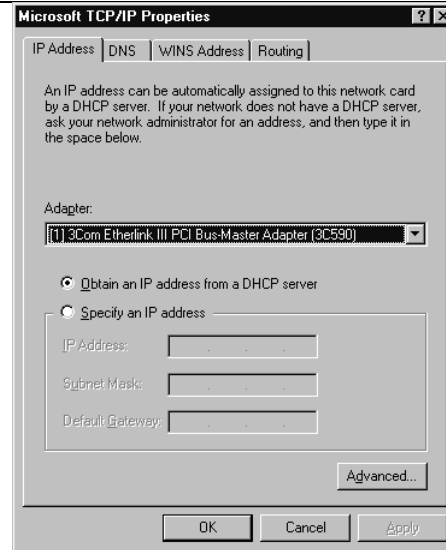


4

- The **TCP/IP Properties** dialog box now displays.
- Click the **IP Address** tab.
- Select the radio button marked **Obtain an IP address from a DHCP server**.
- Click **OK**. This completes the configuration of TCP/IP in Windows NT.

Restart the PC.

Repeat these steps for each PC with this version of Windows on your network.



Verifying TCP/IP Properties for Windows XP, 2000, and NT4

To check your PC's TCP/IP configuration:

1. On the Windows taskbar, click the Start button, and then click Run.

The Run window opens.

2. Type `cmd` and then click OK.

A command window opens

3. Type `ipconfig /all`

Your IP Configuration information will be listed, and should match the values below if you are using the default TCP/IP settings that NETGEAR recommends for connecting through a router or gateway:

- The IP address is between 192.168.0.2 and 192.168.0.254
- The subnet mask is 255.255.255.0

- The default gateway is 192.168.0.1

4. Type `exit`

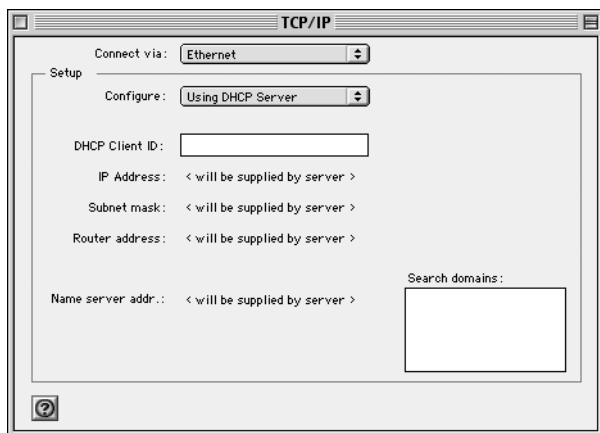
Configuring the Macintosh for TCP/IP Networking

Beginning with Macintosh Operating System 7, TCP/IP is already installed on the Macintosh. On each networked Macintosh, you need to configure TCP/IP to use DHCP.

MacOS 8.6 or 9.x

1. From the Apple menu, select Control Panels, then TCP/IP.

The TCP/IP Control Panel opens:



2. From the “Connect via” box, select your Macintosh’s Ethernet interface.

3. From the “Configure” box, select Using DHCP Server.

You can leave the DHCP Client ID box empty.

4. Close the TCP/IP Control Panel.

5. Repeat this for each Macintosh on your network.

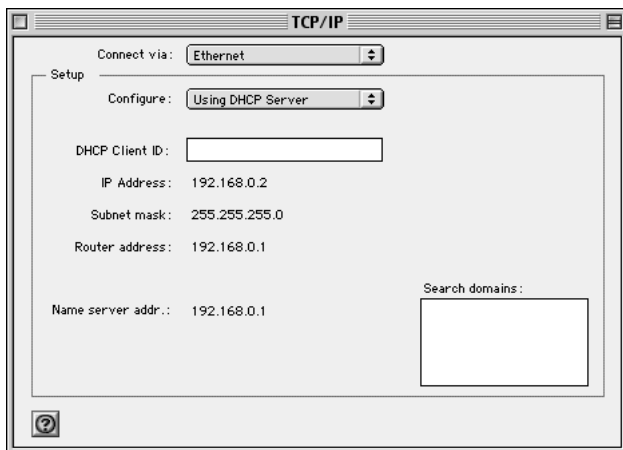
MacOS X

1. From the Apple menu, choose System Preferences, then Network.

2. If not already selected, select Built-in Ethernet in the Configure list.
3. If not already selected, Select Using DHCP in the TCP/IP tab.
4. Click Save.

Verifying TCP/IP Properties for Macintosh Computers

After your Macintosh is configured and has rebooted, you can check the TCP/IP configuration by returning to the TCP/IP Control Panel. From the Apple menu, select Control Panels, then TCP/IP.



The panel is updated to show your settings, which should match the values below if you are using the default TCP/IP settings that NETGEAR recommends:

- The IP Address is between 192.168.0.2 and 192.168.0.254
- The Subnet mask is 255.255.255.0
- The Router address is 192.168.0.1

If you do not see these values, you may need to restart your Macintosh or you may need to switch the “Configure” setting to a different option, then back again to “Using DHCP Server”.

Verifying the Readiness of Your Internet Account

For broadband access to the Internet, you need to contract with an Internet service provider (ISP) for a single-user Internet access account using a cable modem or DSL modem. This modem must be a separate physical box (not a card) and must provide an Ethernet port intended for connection to a Network Interface Card (NIC) in a computer. Your router does not support a USB-connected broadband modem.

For a single-user Internet account, your ISP supplies TCP/IP configuration information for one computer. With a typical account, much of the configuration information is dynamically assigned when your PC is first booted up while connected to the ISP, and you will not need to know that dynamic information.

In order to share the Internet connection among several computers, your router takes the place of the single PC, and you need to configure it with the TCP/IP information that the single PC would normally use. When the router's Internet port is connected to the broadband modem, the router appears to be a single PC to the ISP. The router then allows the PCs on the local network to masquerade as the single PC to access the Internet through the broadband modem. The method used by the router to accomplish this is called Network Address Translation (NAT) or IP masquerading.

Are Login Protocols Used?

Some ISPs require a special login protocol, in which you must enter a login name and password in order to access the Internet. If you normally log in to your Internet account by running a program such as WinPOET or EnterNet, then your account uses PPP over Ethernet (PPPoE).

When you configure your router, you need to enter your login name and password in the router's configuration menus. After your network and router are configured, the router will perform the login task when needed, and you will no longer need to run the login program from your PC. It is not necessary to uninstall the login program.

What Is Your Configuration Information?

More and more, ISPs are dynamically assigning configuration information. However, if your ISP does not dynamically assign configuration information but instead used fixed configurations, your ISP should have given you the following basic information for your account:

- An IP address and subnet mask
- A gateway IP address, which is the address of the ISP's router
- One or more domain name server (DNS) IP addresses
- Host name and domain suffix

For example, your account's full server names may look like this:

`mail.xxx.yyy.com`

In this example, the domain suffix is `xxx.yyy.com`.

If any of these items are dynamically supplied by the ISP, your router automatically acquires them.

If an ISP technician configured your PC during the installation of the broadband modem, or if you configured it using instructions provided by your ISP, you need to copy the configuration information from your PC's Network TCP/IP Properties window or Macintosh TCP/IP Control Panel before reconfiguring your PC for use with the router. These procedures are described next.

Obtaining ISP Configuration Information for Windows Computers

As mentioned above, you may need to collect configuration information from your PC so that you can use this information when you configure the DG632 modem router. Following this procedure is only necessary when your ISP does not dynamically supply the account information.

To get the information you need to configure the router for Internet access:

1. On the Windows taskbar, click the Start button, point to Settings, and then click Control Panel.
2. Double-click the Network icon.

The Network window opens, which displays a list of installed components.

3. Select TCP/IP, and then click Properties.

The TCP/IP Properties dialog box opens.

4. Select the IP Address tab.

If an IP address and subnet mask are shown, write down the information. If an address is present, your account uses a fixed (static) IP address. If no address is present, your account uses a dynamically-assigned IP address. Click "Obtain an IP address automatically".

5. Select the Gateway tab.

If an IP address appears under Installed Gateways, write down the address. This is the ISP's gateway address. Select the address and then click Remove to remove the gateway address.

6. Select the DNS Configuration tab.

If any DNS server addresses are shown, write down the addresses. If any information appears in the Host or Domain information box, write it down. Click Disable DNS.

7. Click OK to save your changes and close the TCP/IP Properties dialog box.

You are returned to the Network window.

8. Click OK.

9. Reboot your PC at the prompt. You may also be prompted to insert your Windows CD.

Obtaining ISP Configuration Information for Macintosh Computers

As mentioned above, you may need to collect configuration information from your Macintosh so that you can use this information when you configure the DG632 modem router. Following this procedure is only necessary when your ISP does not dynamically supply the account information.

To get the information you need to configure the router for Internet access:

1. From the Apple menu, select Control Panels, then TCP/IP.

The TCP/IP Control Panel opens, which displays a list of configuration settings. If the "Configure" setting is "Using DHCP Server", your account uses a dynamically-assigned IP address. In this case, close the Control Panel and skip the rest of this section.

2. If an IP address and subnet mask are shown, write down the information.
3. If an IP address appears under Router address, write down the address. This is the ISP's gateway address.
4. If any Name Server addresses are shown, write down the addresses. These are your ISP's DNS addresses.
5. If any information appears in the Search domains information box, write it down.
6. Change the "Configure" setting to "Using DHCP Server".
7. Close the TCP/IP Control Panel.

Restarting the Network

Once you have set up your computers to work with the router, you must reset the network for the devices to be able to communicate correctly. Restart any computer that is connected to the firewall.

After configuring all of your computers for TCP/IP networking and restarting them, and connecting them to the local network of your DG632 modem router, you are ready to access and configure the router.

Glossary

10BASE-T	IEEE 802.3 specification for 10 Mbps Ethernet over twisted pair wiring.
100BASE-Tx	IEEE 802.3 specification for 100 Mbps Ethernet over twisted pair wiring.
ADSL	<i>See</i> Asymmetric Digital Subscriber Line
Asymmetric Digital Subscriber Line	A technology for sending data over regular telephone lines. ADSL allows data rates up to 8 Mbps downstream and 640 Kbps upstream.
Denial of Service attack	DoS. A hacker attack designed to prevent your computer or network from operating or communicating.
DHCP	<i>See</i> Dynamic Host Configuration Protocol.
DNS	<i>See</i> Domain Name Server.
Domain Name	A descriptive name for an address or group of addresses on the Internet. Domain names are of the form of a registered entity name plus one of a number of predefined top level suffixes such as .com, .edu, .uk, and so on. For example, in the address mail.NETGEAR.com, mail is a server name and NETGEAR.com is the domain.
Domain Name Server	A Domain Name Server (DNS) resolves descriptive names of network resources (such as www.NETGEAR.com) to numeric IP addresses.
DSLAM	DSL Access Multiplexor. The piece of equipment at the telephone company central office that provides the ADSL signal.
Dynamic Host Configuration Protocol	DHCP. An Ethernet protocol specifying how a centralized DHCP server can assign network configuration information to multiple DHCP clients. The assigned information includes IP addresses, DNS addresses, and gateway (router) addresses.
Gateway	A local device, usually a router, that connects hosts on a local network to other networks.
IP	<i>See</i> Internet Protocol.

IP Address	A four-byte number uniquely defining each host on the Internet. Ranges of addresses are assigned by Internic, an organization formed for this purpose. Usually written in dotted-decimal notation with periods separating the bytes (for example, 134.177.244.57).
IPSec	Internet Protocol Security. IPSec is a series of guidelines for securing private information transmitted over public networks. IPSec is a VPN method providing a higher level of security than PPTP.
ISP	Internet service provider.
Internet Protocol	The main internetworking protocol used in the Internet. Used in conjunction with the Transfer Control Protocol (TCP) to form TCP/IP.
LAN	<i>See</i> local area network.
local area network	LAN. A communications network serving users within a limited area, such as one floor of a building. A LAN typically connects multiple personal computers and shared network devices such as storage and printers. Although many technologies exist to implement a LAN, Ethernet is the most common for connecting personal computers.
MAC address	Media Access Control address. A unique 48-bit hardware address assigned to every Ethernet node. Usually written in the form 01:23:45:67:89:ab.
Mbps	Megabits per second.
MSB	<i>See</i> Most Significant Bit or Most Significant Byte.
MTU	<i>See</i> Maximum Transmission Unit.
Maximum Transmit	The size in bytes of the largest packet that can be sent or received.
Unit	
Most Significant Bit or Most Significant Byte	The portion of a number, address, or field that is farthest left when written as a single number in conventional hexadecimal ordinary notation. The part of the number having the most value.
NAT	<i>See</i> Network Address Translation.
Netmask	A number that explains which part of an IP address comprises the network address and which part is the host address on that network. It can be expressed in dotted-decimal notation or as a number appended to the IP address. For example, a 28-bit mask starting from the MSB can be shown as 255.255.255.192 or as /28 appended to the IP address.

Network Address Translation	A technique by which several hosts share a single IP address for access to the Internet.
packet	A block of information sent over a network. A packet typically contains a source and destination network address, some protocol and length information, a block of data, and a checksum.
PPP	<i>See</i> Point-to-Point Protocol.
PPPoA	<i>See</i> PPP over ATM
PPPoE	<i>See</i> PPP over Ethernet
PPP over ATM	PPPoA. PPP over ATM is a protocol for connecting remote hosts to the Internet over an always-on connection by simulating a dial-up connection.
PPP over Ethernet	PPPoE. PPP over Ethernet is a protocol for connecting remote hosts to the Internet over an always-on connection by simulating a dial-up connection.
PPTP	Point-to-Point Tunneling Protocol. A method for establishing a virtual private network (VPN) by embedding Microsoft's network protocol into Internet packets.
PSTN	Public Switched Telephone Network.
Point-to-Point Protocol	PPP. A protocol allowing a computer using TCP/IP to connect directly to the Internet.
RFC	Request For Comment. Refers to documents published by the Internet Engineering Task Force (IETF) proposing standard protocols and procedures for the Internet. RFCs can be found at www.ietf.org .
RIP	<i>See</i> Routing Information Protocol.
router	A device that forwards data between networks. An IP router forwards data based on IP source and destination addresses.
Routing Information Protocol	A protocol in which routers periodically exchange information with one another so that they can determine minimum distance paths between sources and destinations.
subnet mask	<i>See</i> netmask.
UTP	Unshielded twisted pair. The cable used by 10BASE-T and 100BASE-Tx Ethernet networks.

VCI	Virtual Channel Identifier. Together with the VPI, defines a Virtual Channel through an ATM network. Used by ATM switching equipment to route data through the network.
VPI	Virtual Path Identifier. Together with the VCI, defines a Virtual Channel through an ATM network. Used by ATM switching equipment to route data through the network.
WAN	<i>See</i> wide area network.
wide area network	WAN. A long distance link used to extend or connect remotely located local area networks. The Internet is a large WAN.
Windows Internet Naming Service	WINS. Windows Internet Naming Service is a server process for resolving Windows-based computer names to IP addresses. If a remote network contains a WINS server, your Windows PCs can gather information from that WINS server about its local hosts. This allows your PCs to browse that remote network using Network Neighborhood.
WINS	<i>See</i> Windows Internet Naming Service.